ESSAYS AND ADDRESSES

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Essays and Addresses

By the late

John Young, M.D.

Regius Professor of Natural History in the University of Glasgow

With a Memoir

Glasgow

James MacLehose and Sons

Publishers to the University

1904

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PREFACE

The Committee in charge of the Memorials of Professor Young were instructed by the subscribers to do three things:

To obtain a Medallion Portrait of Dr. Young to be placed in the Hunterian Museum, and a Replica for Queen Margaret College.

To reprint and publish a few of Dr. Young's more popular Essays or Addresses, with a short sketch of his life prefixed.

To prepare a Catalogue of the very valuable and little known Manuscripts in the Hunterian Museum, a labour in which Dr. Young had long been engaged.

This small volume fulfils the second of these instructions. The biographical sketch has been written, at the request of the Committee, by Dr. Yellowlees, a friend of Dr. Young ever since college days.

F. O. BOWER,
Chairman of Committee.

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Engraved from Medallion in the Hunterian Museum, by permission of Professor Young for *William Hunter, Anatomist, Physician, Obstetrician*, by R. Hingston Fox, M.D., and reproduced here by Dr. Fox's permission.

PORTRAIT OF PROFESSOR YOUNG, - - - - - 65

BIOGRAPHICAL SKETCH

It is the fashion nowadays to disparage heredity and to extol environment as the main factor in the formation of character. No one who knew John Young and his parents could question the power of heredity.

His father brought with him to Edinburgh from the north-east of Scotland the shrewdness and energy which flourish there, but they were enlightened and widened by a liberal education, and enhanced and fortified by sterling principle. After serving twenty-nine years in the private bank of Sir William Forbes & Co., he continued his service for fifteen years more in the Union Bank of Scotland, which was formed in 1843 by the union of the private bank with the Union Banking Company of Glasgow. He was greatly esteemed in both banks, and for a number of years before his retiral he was Accountant of the Union Bank in its Edinburgh office. He was genial, witty, well-read, and an excellent classical scholar—one of the few men who read and quoted Horace up to the last.

His mother was a Grant from Strathspey—a true

highland lady of a type fast disappearing in our cosmopolitan age. Her innate quiet dignity, her repression of all tender emotion as if it were weakness, her quick instinct for the right and true, her scorn of shams and affectations, and the vigorous words in which she exposed them, were all characteristic. Her devoted love for her son and her secret pride in him were too deep for expression, and were often concealed under captious criticism or faintest praise; but they understood each other; and the son's deep affection satisfied the mother's heart, possibly none the less that there was in it a reverence and obedience which he yielded to her alone.

John Young, the only child of his parents who reached mature years, was born at Edinburgh on 17th November, 1835. It is noteworthy that his first prize in the elementary school which he attended was a book on Natural History. He was educated at the High School of Edinburgh, of which Dr. Leonard Schmitz was then the distinguished head, and his exceptional ability was shown by the prominent place he held in the prize lists from 1846 till 1851.

In 1851 he entered the University, and soon resolved to devote himself to the study of Medicine. The Medical School of Edinburgh was perhaps at its best during his student days, John Goodsir and Edward Forbes, Allison, Syme, Simpson, Christison, Bennett, Gairdner, Begbie, and others all adding to its fame.

Young was an excellent student, full of interest in

his work, brilliant rather than plodding, and impatient of the drudgery of acquiring facts until he saw them vivified by their scientific purpose or by their value in actual practice. His acute mind revelled in medical problems, and in the perplexities of a difficult diagnosis. He could not always command the patience needful for accuracy, and if some obscure or unusual symptom arrested his attention, he was apt to give it undue weight.

Playing at diagnosis is often a fascinating game with medical students. On their way home from college after the classes were over, Young and his two chief companions would often select an unknown individual approaching them on the street and infer everything about him from his gait, manner, and appearance. His age, occupation, salary, character, habits, family, residence, church connection, etc., were all expiscated and set forth in a way that would have greatly amazed the subject selected for scrutiny. Young's guesses were always grotesquely brilliant, and formed on such things as the condition of his umbrella, the colour of his necktie, the height of his collar, or the make of his shoes.

Young graduated M.D. Edin. in 1857, and entered eagerly into the duties of the new dignity. Certainly the pleasantest and most profitable part of a young doctor's training, if he be fortunate enough to obtain it, is his period of residence in an infirmary under one of its chief physicians or surgeons, and in immediate charge of

his wards. There is all the interest of a great practice without any afterthought of remuneration, and without an oppressive sense of responsibility.

Sometimes the responsibility comes suddenly and in full force. The writer, while thus resident, was urgently summoned by Young to see a poor child dying of croup in a miserable Edinburgh cellar. There was no time to lose, no time to consult others, so we performed tracheotomy in that dark, wretched cellar by the light of two tallow candles stuck in bottles. The life was saved, and the child made an excellent recovery, but neither of us ever forgot the scene or the anxiety.

In the autumn of 1857 Young also became a resident in the infirmary, and greatly enjoyed both the splendid opportunities for gaining experience in medical work and the delightful social life of the residents The old infirmary is gone now, but the residents of these long-ago days remember it with an abiding affection which, it seems to them, no magnificent new infirmary could ever inspire.

The meetings of the Royal Medical Society were a memorable feature of that period. Young and his chief friends were office-bearers, and took somewhat prominent part in the Society's meetings, where junior graduates and senior students aired their opinions and discussed their experiences with less than the knowledge and more than the confidence of their seniors.

In July, 1858, Young was appointed one of the assistant physicians to the Royal Edinburgh Asylum,

and again became a colleague of the writer. It was the infirmary experience repeated, and with yet more interesting patients. The senior assistant physician was an older fellow-student, Dr. Sibbald, now Sir John Sibbald, and long one of the Lunacy Commissioners for Scotland. The chief was Dr. David Skae, for many years the very able and distinguished physician of the Asylum.

The life at Morningside was most pleasant. The work was intensely interesting, and the discussions of its problems, metaphysical or practical, as each day evolved them, was a great enjoyment. Dr. Skae fully trusted his assistants, and the dignity of responsibility made men of them. No one could have enjoyed this period more than Young. His alert mind delighted in tracking insane thought through its mysterious mazes, in discovering concealed motives, and in finding the explanation of abrupt irrelevancy or sudden abstraction. His personal interest in the patients, his vivacious manner, and his ready retorts made him a great favourite. Often in later life did he recall this happy time, and often did we interview again in memory our old Morningside friends. When we did so, Young would laugh anew at the reply of a polite old gentleman whom he had courteously greeted with "Good morning, Mr. H. How are you to-day?" The last word had chiefly impressed the patient, and he instantly replied, with equal courtesy, "Quite well, thank you, sir. How are you to-morrow?"

When familiarity had somewhat blunted the eagerness

of his first interest, Young found that the work, if done earnestly, as he did it, was neither easy nor light, and that a long asylum visit demanded no small amount of mental energy. When to this was added the great anxiety which the care of certain classes of patients entailed, the disappointment at the relapse of others, and the varied and often worrying duties of the position, it was little wonder that Young's sensitive and nervous temperament found the constant strain too great. He had never intended to adopt asylum practice as his specialty, and he resigned his position at Morningside early in 1860, leaving perhaps with less regret because his two original colleagues had left before him.

Perhaps the want of a definite preference for any one department of medicine, perhaps an unconscious revulsion from the impenetrable mysteries of mind to the more manifest wonders of nature, perhaps the pleasure of rejoining old schoolfellows, probably all the three influences determined Young's next step. He took what proved the most momentous step of his life when he joined the Geological Survey.

The following notes on Young's life and work on the Survey are from the pen of his old school-fellow and life-long friend, Professor James Geikie of Edinburgh University.

"It was in 1861 that John Young joined the Geological Survey, Sir Roderick Murchison being at that time Director-General, and Professor A. C. Ramsay Local

Director. The Scottish staff was a very small one—Young's only colleagues being Mr. H. H. Howell and my brother Archibald. As boys, Young and the latter had sat on the same form at the High School, Edinburgh, and were therefore old friends. I can still recall some of their doings in those early days. Their occasional holidays were often devoted to long wanderings afoot—now up the valley of the Water of Leith to its source, now over the Pentlands, and not infrequently to the limestone quarries at Gilmerton or Burdiehouse, or along the shores of the Forth. Although some years their junior, I was allowed now and again to join those excursions—many or most of which had fossil-hunting for their object. Not improbably the glamour of those early days, and the pictures which in after years my brother drew of his life as a field-geologist on the Survey, had much influence with Young when he finally resolved to drop his medical career and become an official 'stone-breaker.' A few months after his appointment I entered the same service, and, as his field of labour and mine were for some years never far apart, and we had frequent opportunities of meeting, our early acquaintance soon ripened into warm friendship. Those were halcyon days, and I am sure Young enjoyed them to the full. Often in subsequent years, after he had finally settled in Glasgow, he would recur to them, recalling with delight old scenes and old faces which he and I had known together. The

life of a field-geologist is, from many points of view, an enviable one, and, could youth and strength endure, one might well be content to follow it to the end. To a large extent the Government geologist is his own master. After his particular field of labour has been allotted to him, he is allowed to do his work in his own way. Sallying forth on his daily walk, he wanders unforbidden everywhere and anywhere, absorbed in his delightful task and noting down each bit of evidence as he goes, with the view of puzzling out the geological structure. Sometimes this reveals itself at once, but often it is quite otherwise. Perhaps the rocks are largely concealed and the evidence scanty in the extreme; or, while abundantly exposed, the rocks may yet be so confusedly arranged that it seems almost hopeless to evolve any order out of the chaos. Nothing daunted, however, the geologist traverses and re-traverses the ground until the clue to the puzzle is at last got hold of, and the complicated structure is laid down upon the map. In the course of his rambles he naturally becomes acquainted with every nook and corner of his district. He does not need to envy either the angler or the sportsman, for the sounds and sights of nature, which add so much to their pleasure, may be no less thoroughly enjoyed by the geologist. To a man like Young, who was endowed in no small measure with artistic and poetic sensibility, they never failed to appeal. He often expressed regret that he had not

sufficient skill with his pencil or his brush to reproduce such scenes as particularly impressed him. The numerous outlines and blurred smudges which found their way into his note-books were like nothing in particular, he would smilingly remark; but they served, he said, to refresh his memory, and with such crude aids he could readily in imagination recapture the originals.

"Up to the date of Young's appointment the Geological Survey had taken no particular notice of what are known as 'Superficial Foundations.' Indeed, these deposits were considered to be rather a nuisance, since they largely covered or concealed the rocky framework of the country, the structure of which it was the main object of the Survey to represent upon their maps and sections. At that time it was generally believed that the 'drift deposits' of the low-lying tracts of the country had been dropped by icebergs during a period of submergence. This notion, however, had already been called in question, and it became evident, especially to A. C. Ramsay, our Local Director, that the deposits referred to could no longer be ignored, but should be surveyed and mapped with as much care as the 'solid rocks' over which they had been spread. To Young, B. N. Peach (who had recently entered the service), and myself, this task was assigned. We were told off to go over all the ground, the solid geology of which had already been mapped, and to insert in the maps the necessary information as to the extent and

distribution of the drift. As we had thus only one set of lines to follow, it is obvious that this re-survey of the ground could be rapidly accomplished. We had therefore frequently to shift our quarters, seldom tarrying longer than a few weeks in one place, so that in a year or so we had tramped carefully over the major portion of Fife and the Lothians.

"I have said that the field-geologist's life is in many respects to be envied: it must be admitted, however, that it is a somewhat lonely one. Now and again he and one of his colleagues may occupy the same quarters, but each sets off after breakfast to traverse his own allotted area, and they do not meet again till the evening. Usually, however, their quarters are a few or it may be many miles apart, and then they only come together when it is necessary to join up the several geological lines they have been running. These meetings, I need hardly say, were always eagerly anticipated, and they linger gratefully in my memory. As I write I can see my friend's keen face and sparkling eye, can hear his voice now in sharp disputation or earnest argument, or anon laughingly describing some absurd adventure, or some odd character he had encountered, for he had always the liveliest appreciation of the comical side of things. I suppose we were 'roughing it' in those days, for our quarters and our fare were assuredly of the simplest. One does not look for luxury in a shepherd's shieling or a gamekeeper's cottage.

But to the keen appetite of youth and a healthy and invigorating occupation, nothing we encountered seemed to come amiss. We had no clients—no business-folk of any kind to deal with, and were truly without cares or worries. Small wonder, then, that with dyspepsia and its accompanying woes we should have had only an academic acquaintance. Seated by a cozy peat fire, enveloped in clouds of tobacco smoke—confabulating, discussing, speculating, laughing over quaint scenes and droll experiences, life (if we had only known it!) had not much better to give. In those far-off days Young certainly drank of the wine of life, and enjoyed it as only a whole-hearted man can do.

"The survey of the drift deposits of Fife and the Lothians having been completed, Young and I shifted to virgin ground in Peeblesshire. For many months my friend was stationed in the upper reaches of the Tweed valley, and we did not meet so frequently. In those high-lying regions he found much to interest him. The glacial deposits especially arrested his attention, and he subsequently wrote an interesting and instructive account of the old glaciers which formerly occupied the group of glens round Loch Skene.[1] Some twenty years after Young had left the Geological Survey, I had occasion to traverse those sequestered regions where he had formerly sojourned, and found that the worthy shepherd-folk had

[1] "On the Former Existence of Glaciers in the High Grounds of Southern Scotland," *Quart. Journ. Geol. Soc.*, Vol. xx. p. 452.

not forgotten him. The mention of his name at once secured me a hospitable reception. Many a pleasant tale they had to tell of his kindness. In cases of emergency he had freely put his medical skill at their service —now and again setting off on foot to visit some clamant case after his own day's work had been completed, and when he might almost have been excused had he delayed acting the Samaritan till next morning. In those days Young was very active, and notwithstanding the heavy accoutrements he affected, could give points to his colleagues, so far at least as rapidity of movement was concerned. In addition to the ponderous hobnail boots of the field-geologist, he wore wonderful leather leggings, which came up well on the thighs, and were enough to handicap any ordinary pedestrian. The rapidity with which he passed from point to point across hill and dale astonished the hardy shepherds. It was his pace they admired—the distance he could accomplish in a relatively short time. The distance itself was nothing to them. I never knew a shepherd who could be daunted by the mere length of a journey. But your typical shepherd is like the geological agents of change—he prefers to take his time; he moves leisurely but steadfastly, never unduly hastening, never slackening his pace. Young and I have often timed such a man as we watched him from some commanding height, ascending and descending steep slopes, and found that his pace rarely exceeded, and was generally under, three miles an hour. But, then, the

gradients did not seem to affect him—uphill or downhill, the rate of progression seldom or never varied, and, like Tennyson's brook, he could apparently go on for ever.

"Having completed the survey of the Loch Skene district, Young joined me at Peebles, and for many months we occupied the same quarters. One of the greatest drawbacks to roughing it in the heart of the hills is the want of books. Very few can be taken with one, and in the long evenings these are quickly devoured. With the exception of one or two scientific works which he thought might be useful for reference, the only books which Young carried with him into out-of-the-way places were a Shakespeare, now and again some German poet, and some half-dozen miscellaneous volumes of more or less purely literary interest. In Peebles he lived under more civilised conditions. Edinburgh was within easy reach by rail, and his room soon became stocked with a constantly changing collection of books of all kinds—for my friend was an omnivorous reader. He took the opportunity at this time of doing some palæontological work, the leisure afforded by stormy weather—during the prevalence of which surveying becomes impossible—being devoted to the study of certain fossil fishes which, if I remember rightly, had been entrusted to him for description by Professor Huxley. A somewhat constant companion of his during our sojourn at Peebles was Scott's *Border Minstrelsy*, from which enchanting volume

he never tired quoting lines or declaiming such ballads as had captivated his fancy. Needless to add that the *Black Dwarf* and *St. Ronan's Well* were conned and lovingly appreciated, for he took a special pleasure in reading Scott's novels amidst the scenes in which the great wizard's characters played out their parts. The unfailing skill with which local colour and feeling had been caught by Sir Walter never failed to excite Young's admiration. I remember that after dipping into Lockhart's *Life* one evening, he next morning induced me to hang up geology for the day, and set off with him to Ashiestiel—which hitherto neither of us had seen. It was towards the end of autumn, when the days were short, and we lingered so long in the neighbourhood of Scott's old home that night had fallen long before we found ourselves back again in Peebles.

"In those cheery days a walk of twenty-five or thirty miles and more was thought but little of by Young or any of his chums on the Survey. As the ground surrounding one's station became worked up, one might by-and-by have a daily tramp of six or seven miles before the scene of labour could be reached. One would then usually spend five hours in geologising, which often necessitated much hard walking and climbing, and after the day's task was over, the return journey of six or seven miles had still to be faced. Young was very regular in the performance of his duties, and seldom spent fewer than nine hours on the tramp, during which

time he would cover twenty miles or thereabout—sometimes more, sometimes less, according to the nature of the work. But during all the time I was associated with him, I do not remember that he ever complained of fatigue, or showed any sign of weariness after the most trying day's work. When the outer man had been tubbed and the inner man duly refreshed, he was ready for his book, or his specimens, or for any social relaxation he might have had on hand. Nowadays a field-geologist, mounted on 'the poor man's horse,' enjoys advantages to which Young was a stranger. But I sometimes doubt whether the advantages are always on the side of his cycling successors. It is certainly delightful, after a ride of seven or eight miles, to arrive quite fresh on the scene of one's work for the day. But when, as often happens, the return journey must be made in the teeth of heavy wind and rain, and upon none of the best of roads, 'shanks' naigie' is undoubtedly the better horse. Having tried both, I think I am not mistaken. Nor am I without a vague suspicion that cycling tends to demoralise a pedestrian, and that he who cycles much is more apt to take his walking in studied moderation than he to whom the 'horned beast' is anathema.

"Young often looked back to his sojourn in Peebles as one of the pleasantest of his experiences on the Survey. Forty years ago the old gibe—'as quiet as the grave or even as Peebles'—was not so very inapplicable as it might be thought now. The native in those days had

room to grow and develop his particular idiosyncrasies, so that well-marked personalities were not infrequently in evidence. Alas! all the elderly folk whose hospitality we then enjoyed have passed away. Yet only nine years ago I found our old landlady still hale and hearty, and many were her inquiries about 'the Doctor,' whose thoughtful kindness had as usual left a lasting impression. I was amused when she asked me if he still insisted upon greasing his own boots. It brought back the picture of Young smoking his pipe after breakfast, while he carefully plastered the seams and rubbed the leather of his boots and leggings, in view of the wet bogs he had to trudge across. Amongst his friends in the good town I think none was more kindly remembered than the minister of the Auld Kirk—Dr. Monilaws—an able and interesting man, who preached excellent if somewhat lengthy sermons. He was a bit of an original, occasionally expressing himself in unconventional but striking language. Young used to treasure up some of the odd sayings and doings of this worthy man, of which the following incident, which Young would relate with much glee, may be taken as a sample. On one occasion Dr. Monilaws had been preaching to a congregation which, for some reason or other, was not so large as usual, so that one of his hearers, a certain buirdly forester, with notably red hair, had a whole pew to himself. The day was warm, the forester had probably walked some distance, and perhaps the minister was not

quite so lively as usual. Be that, however, as it might, the sermon had not been long in progress before the poor forester began to nod, and finally fell fast asleep. Unfortunately for him, he was not a quiet sleeper, but for a time only the occupants of the adjoining pews were disturbed. At last, however, one portentous snort started the minister. 'Waken!' cried the indignant preacher, as he thumped the pulpit; 'waken! It's you with the red head that I mean!' This droll incident had a dénouement which greatly amused Young. Some time after he had told me the tale he encountered a red-headed man chopping wood in a plantation near Traquair. Anxious to know whether he had come upon the real original of the story, Young got into a chat with the man, and soon learned that he indeed hailed from Peebles. The following colloquy ensued: 'How could you leave a braw town like Peebles for a quiet place like this?' 'Weel, d'ye see, our minister, Mr. Monilaws, kind o' insulted me.' 'Oh, you're joking! I'm sure Mr. Monilaws would be the last to insult any man—he is kindness itself.' He then gave his account of the incident in the Auld Kirk, which did not differ materially from Young's version. 'Now, you'll obsairve,' he said with great gravity and some indignation, 'it's no' that I mind the colour o' my hair, but I maun say I didna like to ha'e my reid heid flung in the face o' the congregation.'

"I have lingered so long over the Peeblesshire memories that my reminiscences of the closing years of Young's

connection with the Survey must be brief. During the autumn of 1863 he and I sojourned in the neighbourhood of St Mary's Loch, and there the survey of the county, so far as we had to do with it, came to an end. Early in the following spring we found ourselves in St. Andrews, ready to commence the geological survey of the Ochils. As the work progressed we passed westwards into the hills themselves—Young taking up his station on the northern slopes of the range, while the southern slopes were allotted to B. N. Peach and me. As Young's territory marched with mine, we not infrequently met along our mutual boundaries, and many a pleasant day's ramble we had together. The geology was a change from that of Peeblesshire, where the rocks show a somewhat monotonous succession of grey wackis and shales. In the Ochils there was more variety—the hills being the remnants of certain ancient volcanoes of old red sandstone times. Before the work was completed we had the usual annual visit of inspection from our local director, Professor Ramsay. These official visits were great events to us youngsters—they were our red-letter days. In Ramsay's genial presence one felt quite at ease, and doubts and difficulties were laid before him without hesitation, for we were sure of his ready and sympathetic help. Young had the greatest admiration for his chief, and used to declare that he was one of the most engaging personalities he had ever met. We could not but wonder at his gentle forbearance as he listened attentively to

what must have seemed to a man of his experience our crude explanations of geological phenomena and our not less rash speculations. So far from ignoring or slighting our opinions, however, he would treat them with imperturbable gravity, and even enter into argument with us. Such discussions were wholly to Young's taste—his vivacity, astuteness, and nimble wit being highly appreciated by the older man. Young indeed was never better pleased than when defending a position which he well knew was far from being inexpugnable. He was perhaps too fond of disputation, and in an argument was apt to magnify small points which, more frequently than not, were of little importance. Those who did not know him well were therefore inclined to think him somewhat crotchety. But it was only 'pretty Fanny's way.' If one did not excite him by opposition, he was as capable as any man of taking sane views and coming to judicious conclusions. One of our good colleagues on the English Geological Survey, William Whitaker —loved and esteemed by all who knew him—was, in a different way, a man quick to see difficulties and take exceptions. Ramsay had laughingly dubbed him his 'Bill of Exceptions,' and, nodding his head at Young, would say, 'I'll have to put you in the same pigeon-hole with my Bill of Exceptions.' Our discussions often turned on the subject of glacial geology, in which Ramsay was an expert and acknowledged authority. It was during his stay with us in the Ochil country that he

wrote his reply to the criticisms which Lyell, Murchison and others had made on his famous paper dealing with the glacial origin of certain lake-basins. He read the manuscript to us and asked for our criticisms! Young, usually keen to scent any apparent weakness in an argument, did not, however, venture to say more than that he was glad he had not to champion the cause of the unbelievers.

"Having referred to Ramsay's annual visits of inspection, I may add a word about another survey experience which Young and his colleagues were glad to repeat when the opportunity came. Every winter, when field-work was in abeyance and the men were in London, the Director General, Sir R. I. Murchison, used to dine the past and present members of the staff and the officials then or formerly connected with the School of Mines. Sir Roderick made an excellent host, and his dinners were highly appreciated. After the close of a year's hard work in the field it was pleasant to meet one's fellow-hammerers and exchange experiences; pleasant also to listen to the droll speeches of men like Huxley, Ramsay, Warington, Smyth, Tyndall, and other seniors; pleasant to laugh over the topical songs which the several rhymsters of the staff had fashioned for the occasion. Old, middle-aged, young—all were equally ready with their effusions, not the least witty and amusing of which came from men who had made world-wide reputations for anything but comic songs.

"In 1864 the work of the Geological Survey was carried on chiefly in Ayrshire. Young was stationed for some time at Girvan, and there met with the accident which slightly lamed him for life. Active and nimble as a mountaineer, he had never yet come to grief; he was a good cragsman, plucky but not foolhardy. It was while crossing the Girvan Water near its mouth that he slipped on a boulder and broke his knee-pan. Possibly, if he had laid up, and given the bone time to mend, all might have been well. Instead of doing so, however, he returned too soon to the field, and continued to work until he could do so no longer. When he was once more on his feet he realised that his days of rapid movement across hill and dale were over. Fortunately for him it was about this time that the Chair of Natural History at Glasgow became vacant, and all Young's old Survey chums rejoiced when they heard of his appointment."

Young's conspicuous ability and his excellent work on the Survey were recognised and rewarded when, in 1866, he was appointed by the Crown Professor of Natural History in the University of Glasgow. This appointment he held for 36 years, combining with it the duties of Keeper of the Hunterian Museum, and also, since 1876, of the Honeyman-Gillespie Lectureship on Geology.

His promotion to the University Chair was soon followed by an event of a more personal kind, his mar-

riage to a daughter of his old and honoured teacher, Dr. Leonard Schmitz. A most suitable and invaluable helpmeet did she prove in their life-long union, not only as a wife and as mother of his children, but by sharing his tastes, appreciating his work, sympathising in his difficulties, and wisely restraining his too impetuous impulses.

It was an extraordinary change from the free outdoor life of a field geologist to the daily delivery of systematic lectures on Natural History from a University Chair, but Young rose to the occasion, and worked nobly to fit himself for its duties.

Scarcely had he become accustomed to the work when a Herculean task was imposed upon him, which taxed even his energies to the utmost. The University was leaving its old home in High Street for the new buildings on Gilmorehill, and the great Hunterian Museum, of which he was the keeper, with its countless specimens, preparations, minerals, coins, manuscripts, books, and pictures, a collection beyond number and beyond price, had to be transported to the new abode. With the invaluable help of the learned and painstaking under-keeper, also a John Young, the great task was accomplished, but at an expenditure of thought and care and toil and time which no words can express.

In 1876 Young's old subject became a more prominent part of his teaching. A new Lectureship on Geology was instituted, and he was appointed the first

Honeyman-Gillespie Lecturer. Henceforth for part of the session he lectured concurrently on the two subjects, Natural History and Geology.

In his systematic lectures Young scorned the old beaten track of mere fact-teaching, as if the great object was to prepare the student to pass examinations. He taught his subject in its widest sense, not as a grinder, and often diverged into speculations, generalisations, and analogies, untouched by the text-book, thus delighting the senior, though often mystifying the junior, students. He always asserted that the systematic lectures in the medical classes were far too numerous, and a great waste of the students' time. He felt that they consisted largely of what a good text-book could as well supply, and that the really valuable teaching was done in tutorial classes, in the practical laboratories, and in the hospitals.

A former assistant in the class states that Young was one of the very first (early in the seventies) to teach Zoology practically in the laboratory by making the students handle, examine, dissect, and observe for themselves creatures typical of the chief groups of the animal kingdom. He made out and circulated in the class a descriptive sketch of each creature to be dissected by the students, and of the different organs laid bare as the dissection proceeded. These sketches were models of brevity, accuracy, and clearness. Surely when excellent text-books abound the antiquated method of daily

systematic lectures might well be modified, and the number of lectures greatly reduced.

An old student of twenty-five years ago sends me this weird portrait of Young as he appeared to a freshman: "I can see him now hurrying into the class-room, with a wisp of a gown about him, untidy, impetuous, scornful, fixing us with his hawk eyes and beetled brows, throwing his scrap of paper on the desk, hitching his shoulders, and impatiently addressing himself to an apparently hateful task. . . . It was even said that no one set a lower value on his lectures that did he himself—he must perforce, God help him, deliver them, and we must, the pity of it, endure them."

Another and more recent student—and they are better judges than outsiders—sends me the following very just estimate of his old teacher: "I was intensely interested in his lectures, both Zoological and Geological, and that not so much by the matter as by the manner in which he touched off a topic. He was always vivacious in his methods of explanation, and often vividly graphic in his descriptions, which were, however, not so much word pictures as silhouettes, clear striking outlines, sharply defined, uncompromising as the contrasts of black and white. His wide range of sympathies and interests appeared to furnish him with illustrations of his subjects drawn from every field of research, and his adroit draughtsmanship supplied a running commentary on all he described.

"His teaching seemed to me more allusive than our range of reading could take in at once, and we knew if we missed a point we should not have another chance to overtake it. There was no repetition or recapitulation. It was a case all through the session of 'carpe diem.' Not being able to attend with very great regularity, I felt this breathless haste exhausting. He seemed to take it for granted that the students read the text-books in advance of his lectures; when this was done, I have no doubt the latter proved a piquant and original flavouring to what was mostly a rather stodgy meal. His witty impromptus were always welcome to the class, and not least when some member or other had to wince under them. He recalled the *Esprit Gaulois* of some genial savant, and was altogether much more like a Frenchman than a Scot. He was a good friend to me, and continued to take a kindly interest in my career after I left his class."

Young's easy and accurate drawing in illustrating his lectures deserves notice. By practice and good taste he had attained great proficiency, and many of his class diagrams and illustrations were not only accurate and informing, but artistic and pictorial.

To all his students Young was more than merely a teacher. Perhaps they rather feared him at first, for his manner was often abrupt, his words rapid, and his wit pungent, but they soon discovered that, as one of them said, "under that rugged shell a good soul lurked,"

and that among all their teachers they had not a more accessible, more sympathetic or more helpful friend. Many an old student can testify to his thoughtful and painstaking kindness, kindness which continued long after student days, and was extended even to the unworthy.

A characteristic story was told me by a former student. His name was the last on a list of men summoned for oral examination, and he had to remain in waiting, as alphabetical order was not always adhered to. When at last he was called into the room, Young was having tea, and his first question was, "How long have you had to wait?" "Since 12.30, sir." "Any food?" "No, sir." Young immediately sent for another cup and seated the student beside him; the food was so welcome and the friendliness so reassuring that the man never forgot it, and still declares that he never passed a better examination.

Young's teaching was not confined to the University. All his life he was an earnest advocate of the higher education of women, and no one in Glasgow did more to further it. Long before Queen Margaret College was dreamt of, Young lectured in the city to women students in conjunction with Professors Nichol and Edward Caird. Later, he took, with other friends of the cause, a most active part in the promotion of Queen Margaret College, and greatly rejoiced when their long efforts were crowned and rewarded by the amalgamation of that

College with the University. It is therefore most fitting that when the Medallion Portrait of its old Keeper is placed on the wall of the Hunterian Museum, a replica should also be placed in the Hall of Queen Margaret.

Nowhere was Young happier than in the Museum which he loved so well. He haunted the place like its genius, and midnight often found him working in solitary enjoyment among its treasures. The very variety of its contents which bewildered most people, delighted a mind so alert and versatile as his, and his familiarity with them was as remarkable as their diversity. He intermeddled with all knowledge, and was as omnivorous in acquiring it as was William Hunter in accumulating his wonderful collection. His intellect was so keen and his memory so perfect that he absorbed knowledge with great rapidity, and remembered it without an effort. He became a referee in all things least known to others, and however recondite or unusual the subject, Young was certain to know something about it, and often could throw on it some new and unexpected light.

This universal range of knowledge was of course fatal to the attainment of supreme eminence in any one field. In vain did Huxley—who held Young in high regard—and other friends urge this upon him. The Museum doubtless tempted him in the direction of such universality, but in truth his eager restless temperament refused to dwell in academic quiet, patiently exploring the

arcana of science, and impelled him to energetic activity in the wider arena of life.

His interests were of course centred in the University, and as a member of Senate he took a very active and able part in its administration. The following tribute to the services rendered by him was adopted by the Senate on his resignation of office, and recorded in the Minutes of date 9th October, 1902. A copy was sent to Mrs. Young, but sad to say, Young was then too ill to have it read to him, and he passed away without receiving this earnest expression of the regard in which he was held by his colleagues.

"Dr. John Young has been Professor of Natural History since 1866. During all these years he has lived for the University, and served her with untiring energy and rare versatility of talent, not only as a Master in both branches of Science assigned to his Chair, but also as Keeper of the Hunterian Museum and Library, and as a member of Senate.

"Soon after he entered upon the arduous duties of his Professorship came the removal of the University from High Street to Gilmorehill, involving for him the care of transferring the Museum to its present home. This laborious task he undertook and accomplished with a zeal which only a love for the work could have inspired, and since that time he has continually striven by every means in his power to make its treasures known to the students and the world. He took an active share in

the general management of University affairs, his clear and vigorous intellect and his administrative ability rendering him a most useful member. He was a wise counsellor and a willing worker, while his utterances in the Senate, being those of a ready and skilful debater, with many-sided interests and the courage of his opinions, not seldom lent piquancy and zest to the proceedings.

"His colleagues part with him with profound regret, and desire to express their deep sympathy with him in the continued illness which has led to his retirement."

Young's interests were by no means confined to academic affairs. He could not give to Science what was meant for Mankind. He represented the University on many public Boards, and took an active part—passivity was impossible to Young—in the work, scientific, philanthropic and political, of the city of Glasgow. Such work was very valuable. His familiarity with business affairs, his sound judgment, his absolute honesty of purpose, his fearless support of a good cause in spite of all that ignorance or prejudice or influence could bring against it, were often of great service.

Of course he had the faults of his temperament. An eager and willing worker, he habitually undertook far more than any one man could possibly accomplish, and was thus far too hurried to be methodical or punctual. Unfinished work had constantly to be pushed aside to make room for something more urgent and imperative

at the moment, and *when* the displaced work would be finished was always doubtful; hence the table of his retiring room was a wilderness of confusion which none who saw it could ever forget. Young always vainly imagined that he could find whatever he wanted on it, but calling one day on a friend whose table was often too like his own, he was startled to see it in perfect order, and exclaimed, in his secret longing after the impossible, "Man, if it would only *stay* like that!"

Young was a staunch friend, a genial and delightful companion, a capital talker and story teller. He was often possessed by one subject which was uppermost in his mind at the time; he was clear as to the obstructive folly of those who differed from him thereanent, and could not always credit them with sincerity equal to his own. Young feared no one in discussion, and was always ready for it; his knowledge was so accurate, his opinions so clear, and his retorts so ready, that he could always hold his own. He greatly enjoyed a thorough debate with a good, honest opponent, and the keener the opponent the more was he respected.

Young loathed all affectations, but he had two. He assumed a habitual cynicism which was not part of his real self, for he was naturally a most sympathetic and kind-hearted man, whom all children loved. This cynicism and the irritability which it manifested, were mainly attributable to worry and to chronic gout, from which he suffered greatly. His impatience with "fools"

was emphatic. In hopeless cases he used to quote one of his favourite stories, which told of a man who, in spite of plainest reason and strongest authority, reiterated "You'll never convince me," and received from his exasperated opponent the conclusive reply, "No, but thank the Lord, you'll die some day."

His open scorn of conventionalities was his other affectation. He not only thought as little of them as sensible men do, but he took a pride in outraging them, and often chose to go into town on the top of a car, wearing a short jacket and a huge slouch hat, and smoking a briar pipe.

These affectations were pardoned, indeed they were enjoyed, by his friends. They only increased the uniqueness of his personality.

Thirty-six years of such a life in Glasgow, many of the later years haunted by his old enemy gout, would wear out the strongest, and in 1901 it became evident to those around him, though not to himself, that Young was failing, and that the cerebral vessels were worn. He scorned their fears, deemed his symptoms merely gout, worked on at the college, and in brilliant wit and ready repartee was so like himself that hope revived. When a slight paralysis appeared and destroyed hope, Young tried to ignore it, characteristically declined all assistance, and bravely went to the Museum as usual.

Then memory and speech became slightly impaired at times, and even he realised that he could not attempt

to lecture again. He therefore resigned his chair, but not his Museum, *that* he could not resign; he must be its Keeper while he lived.

Increasing weakness and helplessness made nursing needful and welcome, and the wearied body, which the eager spirit had worn out, quietly ceased work on 13th December, 1902. The restless, eager, brave life, with its joys and sorrows, its efforts and successes, its struggles and disappointments, its anxieties and cares, its weariness and pain seemed to be revealed in its entirety as by a lightning flash in the presence of death, and the calm peace at last was a wonderful and welcome contrast.

Young is survived by a widow, three sons—none of whom have chosen the profession of medicine, and four daughters—three of whom are married. Though he has not left them wealth, nor made himself famous in science, he has left an honoured name as one who served his generation honestly, earnestly, and well. He was ever true to himself and to his best instincts; he hated everything mean and false; he strove fearlessly for everything he deemed right and good; he helped others at any cost of time and trouble; and in his secret heart were deep religious convictions known only to his nearest. Those who knew him best know that they will never see another John Young.

D. Y.

ESSAYS AND ADDRESSES.

THREE ENGLISH MEDICAL MSS.[1] (1550-1660)

[Date 1899]

The Fairfax MS. Book of Apothecaries' Lore and Housewifery nearly Three Centuries Old, published in facsimile in 1890, gives us, thanks to Mr. Geo. Weddell, a hint as to how an English lady of rank dispensed the treasures of her stillroom, in which lingered some of the requirements of an ancient feudal household. The Fairfax family could command at need the services of a learned physician, but Burton, in the *Anatomy of Melancholy*, gives a sad picture of the lot of the poor. "Now for physicians there are in every village so many mountebanks, quacksalvers, Paracelsians as they call themselves, *Caucifici et Sanicidæ* as Clenard terms them, wizards, alchemists, poor vicars, cast apothecaries, physicians' men, barbers, and goodwives professing great skill, that I make great doubts how they shall be maintained, or who shall be their patients." On an earlier page (13, edition 1845),

[1] These MSS. are in the Hunterian Library, and are thus catalogued: Fowler T. 8. 1; Feckenham T. 4. 10; Hunton V. 7. 14.

he says—"Many poor country vicars, for want of other means, are driven to turn mountebanks, quacksalvers, empirics," and "if our greedy patrons" (he held a college living) "hold us to such hard conditions as they commonly do, they will make most of us work at some trade as Paul did." Hard as he is on his brethren, faithful as may be the picture, it is worth remembering that, though he says with Beroaldus, "*non sum medicus nec medicinæ prorsus expers,*" "in the theory of physic I have taken some pains, not with an intent to practise, but to satisfy myself."

In 1616 Henry Fowler, rector of Minchinhampton, began a compilation of medical receipts, but luckily included in the book much gossip which relieves the tedium of an unusually worthless collection of popular medicine. The parish priest inherited from his Romish predecessor the reputation of knowledge with the credit of being able to use it. Fowler was Master in Arts in the University of Oxford, having entered Magdalen Hall in 1583, one of several Fowlers from Gloucestershire. Enrolled as "plebs," he gives a monogram, one of those reputed Flemish, with the note, "This is my father's clothmark," and a quotation (from Bacon?), "Scorn not the merchant or clothier, *sunt reipublicæ nervi*, and without sinews the body can have no strength; it followeth without the merchant and clothier the kingdoms of the earth have neither strength nor motion, the sinews are the cause of motion and sense, *tactus fit per nervos, sine tactu non est animal.*" If, as he says, "*Sermo est imago animi,*" we have a curious insight here into the intelligence of our rector. After the aphorism

> It is a greate folly to prescribe a cure
> Before that thou dost knowe the cause full sure,

he fills 290 closely written leaves with prescriptions intrinsically valueless, and his last lines are—

Theologia est liber dei apertus
In quo pauci legere norunt.

An earlier Henry (supposed by Foster to have been likewise rector of Minchinhampton) entered Queen's as gentleman. A third Henry, born 1584, entered Oriel, and was duly licensed to practise; he is said in Wood's *Fasti* to have "served His Majesty well during the Great Rebellion." John Fowler was of Corpus, became rector of Bisely in 1543, and of Croft in 1552. Another John is mentioned in the MS., 1631; of Roger there is no record. Henry, rector in 1616, was devoted to Magdalen and its members, especially to his tutor, Thomas Allen, scholar of Trinity, 1561, Fellow of Gloucester Hall (now included in Worcester College), 1570, where he died 1632, aged 90. He is the "profounde and mathematicall frende," who, in 1626, obtained a receipt from "Mr. Fenton, the King's Master Chyrurgeon of England; he was master of the hospital by Smithfield," but does not appear in the N.D.B. Mr. Samuel Smyth, a Lincoln man, lived, died, and was buried in Magdalen; he became Med.B. in 1620, relieved Mr. Walters when he ailed of a Squinsie, 1614, and in 1616 cured "that sweet gentleman," Mr. Walter Buclande, also of Magdalen. Against the name of "my good friend, Mr. Will Weston," is a sketch of the college. Local patriotism prompts the note of an occurrence in "*clarissima valle de* Evesham *in com.* Gloucester, the most fruitful place in this our mother Englande." Fowler's antipathy to Scots is curious; without obvious cause he breaks out, "*Barbara Scotorum gens, perfida, plena malorum.*" Now he mentions Alexander Ramsey as "*Scotus, scriptor hujus libri,*" in con-

junction with his own name; this seems to have been the Aberdeen man who took his M.D. at Basle in 1610, became Fellow of the College of Physicians in 1618, and physician to Charles I. There is a dark saying, "I will playe Alexr. Ramsey, thou art a merry knave, *ipso facto*." Possibly they began together, but quarrelled over the collaboration. Another Scot (Wood) is mentioned, but without comment; also, Dr. John Maccollo, an Edinburgh graduate in practice from 1607, admitted to the College of Physicians when physician in ordinary to Charles I. It was something more than national antipathy that prompted the outburst. Mr. Orenge is quoted at least eight times for receipts, but the recognition of him is startling. "Mr. Orenge, a gentleman by birth, a dyer by his trade, yet a very knave in his life and conversation." Another is spoken of who "followeth the famous and scurvy art of rattcatching, quoth Walter Godfrey, a stinking doctor in that poysoned facultie, and cheefe ratcatcher in Q. Elizabeth's shippes, 1599." Old John Lawrence of Arlingham, figures largely. He had a book of receipts and gave verbal advice; he was an ex-monk, "*quondam monachus de Flaxley*," "*quondam monasterii de Flaxley* in the forest of Dean in com. Gloucester, æt. 109." He was a personal and doubtless valuable acquaintance, who was advised by an Italian doctor in a case of what seems acute rheumatism. Father Gardner, of Cromwell, is mentioned, 1623; was he, too, an ex-monk?

Scurvy figures largely in the ailments which the rector seeks to be equipped against, and wonderful are the combinations of herbs to be boiled to a third and mixed in curious ways. Sir Francis Drake devised a remedy, given on the authority of his shipmate, Captain Batman—

"Turnips, scurvy grass, juice (joyst) of lemons, hydor: use them as you please or in your drink, they are most approved good things." But the dominant topic is the plague, a sad memory from 1603, a present evil in 1625, as it was later on in 1665. The purples, seemingly a petechial typhus, is as nothing to the precautions longed for against the plague. The "cures" were, one would fancy, such as availed not save in a decadent epidemic or a convalescent case. They were excellent cordials, tonic, stimulating, just the sort of thing needed where there was nervous depression. Dr. Culpepper (if this was *the* Culpepper, he could have been only 18 years of age in 1634) gives a receipt "to help the plague, and an excellent preservative against the pox and purples": sage, rue, boiled in malmsey, to which are added long pepper, mithridate, angelica, nutmeg, and ginger. "Yf the partie" (the vulgarism of to-day has a respectable antiquity) "suppose that he is infected he is to take a dose hot, get into bed and perspire:" if he is not yet infected, he is to take a course of small doses: a nervous man would be the better for it, infected or not.

Warts, a tired horse, and other meddlesome medications are interspersed with aphorisms, as "The sunne doothe behold the successe of a physician, the earth doothe burie his ignorance. *Nullum medicum esse peritum nisi triginta homines ad orcum dimiserit: sic Plinius. Medicus causarum imperitus nunquam bonus*: who lacks this qualification, *talis medicus est dedecus.*" As there is not a single receipt founded on the recognition of a cause, Fowler does not appreciate the point of the last aphorism he quotes. He is like a certain midland practitioner whose prescriptions were compounded by a kinswoman, and who dismissed an assistant because

he wanted something to which the lady was unaccustomed and with which she was unprovided. As the assistant pithily said, the chief made a diagnosis and treated that. The rector, like the ship captain derided in harbour jests, doled out his receipts according to the name given to the ailment by the patient, or by some one else. But his practice was not always guided by knowledge of how remedies worked. Mary Orchard wore round her neck the following written in her blood :— + *In nomine Christi filii patris spiritus sancti. Amen. Begne* + *beguta* + *geradon* + *gareson* + *gematon* + *pion* + *beomi* + *jasper* + *melchior* + *balthaser* + *Adonary* + *sabaoth* + *emanuel* + *In nomine patris f.s.s. Amen.* There are several such indications that the student of Magdalen was not better, perhaps even worse, than the fifth class of Guy de Chauliac two centuries earlier : " Old women and ignorant persons who apply to the saints in all cases." One can conceive how appeal to a saint might secure good, but cannot imagine how such trash could have effect. Yet Fowler had travelled, but had only gathered rubbish from Italian quacks in Florence, old gypsies, Jews ; was pleased to tell how he had the only touch-piece in England, an Egyptian bean set in silver. His Jewish sympathies are shown by his use of the Hebrew alphabet when he has an alchemical secret to conceal. He is a Rosicrucian, and seems to have been of standing in the mystery. He recommends for palsy that the patient should smell at handkerchiefs which have lain for some days in the eggs of a " horse-aunt's " nest. For epilepsy a poor wandering woman bids him give the moisture to be got from the grave of a man who has been " buried without a cheast : " this moisture or white mummy (?adipocere) " never runneth from a man but in

the month of July." Of this loathsome remedy half a nutshellful in posset is to be taken night and morning. An egg boiled in a patient's urine transfers the ailment to the dog which eats the egg. A more impressive (and cleanly) mode of transfer was to "desire an apple for Christ's sake, cut it in three, write Azaell on the pieces, and eat these"—in the reverse order of inscription, that is the usual thing, but the Rector improves by bidding the pieces to be eaten "at three crossways, and pray that thou mayest be freed from the fever." A hare's blood put under a man's breast will make him reveal everything in his sleep.

Various notable people are mentioned: Sir Thomas Popham, lord-chief-justice (he had a vesical calculus broken up by doses of fennel); Lord Bacon (a cure for jaundice is attributed to him); Robert Fludd, under his fanciful name, de Fluctibus; Mr. George Cottington, Master of Arts, and my old friend, secretary to K. James and to Sir Geo. Calvert; D. Gilbertus decanus de Sarum, "one of the seven great doctors of Christendom"; Mr. Crossley, who cured a courtier of the Danish Court by rubbing his eye with a live cat's tail Mr. T. Allen, already mentioned at Gloucester Hall in 1626, of the College of Physicians in 1671, physician to Bethlehem Hospital, (—but I suspect there are two of the name); Lodge of Trinity College, the poet, M.D. Avignon, 1602, died in 1625; Percival Willoughby, reputed a booklover, but needing a better voucher than that of the rector,—he was the son of a Nottingham baronet, A.B. Oxford, practised at Derby, of the College of Physicians, 1640; Dr. Walter Baylie, Prebendary of Dulcote, 1579, admitted to practise, Oxford, 1558, Queen's professor of physic, 1561, and Queen's physician,

died 1592; John Deighton of Trinity, practitioner at Bristol, died aged 71, buried at Gloucester, 1676; James van Otten, a Belgian, admitted to practise surgery, 1620, had cured morphew, 1612; Thomas Kidwelly, at the Bath, 1634, "servant" to Dr. Masters at Cicester, chief physician to Queen Elizabeth, then a companion of Dr. Dee and Mr. Emry, "the profoundest of the sons of arts," lastly companion with Sir Edward Kelly, servant to Mr. Emry, merchant, a favourite with Sir Walter Rayleigh. "After many years and tedious labours they found out this mystery of the *Antimonium purgans* a rare catholicon." Mr. K. was "at Cotbridge, at the Lord of Colerayne's house, 2 miles from Barnard, 9 miles from London." Fowler was to "direct letters for Mr. K. to the care of Mr. Borage, apothecary at the London Stone." Dr. Laughton, president of Magdalen College, is also mentioned.

A receipt for wood-evill (sturdy in sheep) serves to introduce a curious tale. John Siseam got the cure from old Rodger Cambridge, who had it from Hen. Davis the Bruter (*i.e.*, the prophesier) 1554 *de parochia Minchinhampton.* This Davis "did then in public places diverse times declare that a Scot should come over to this land upon a wooden horse, which was the long bridge over the great river of Tweed, and that this land of England should be ruled by a Scot. He foretold of a mighty blazing star which happened in 1618, and that about twenty years after it there should be a mighty rebellion, in the north to England's cost, that there should be a second growing, that the rebel heads should lie on the ground, and the earth should be glutted with blood: "1609 *scripsi, sed hoc mihi declaratus fuit* 1604." This Davis foretold strange

things. "My tenant Margaret Smyth, who was 105 years old when she died, shed her hair and teeth three times, a most strange and unheard of thing, she was a kinswoman of that Davis, and many strange things are come to pass that he did foretell: he foretold the very hour of his death, who was a very goodly man." This compliment does not exclude the recollection that people said Robert Burton, rather than find his nativity wrong, sent up his soul to heaven in a slip-knot. The sturdy cure was tar in the ears, and herbs, but the sheep were to be fed on fresh grass: as the ailment is emphatically one of dirty pastures, the rural adviser was ahead of many farmers of to-day.

Fowler was a man of slender parts, some knowledge of books—of a kind; a most inaccurate scholar, his Latin is bad, his Hebrew foolish, and he does not pretend to Greek. His only claim to attention is that a worthless book has been the means of conveying some collateral information regarding the time. Since we have no better, let us be thankful for Fowler.

John Feckenham, the last Abbot of Westminster, died in 1585, thirty years after having attained that dignity. Richard Howman de Feckenham, a Benedictine, was prior at Worcester in 1274; in 1409, a preaching friar, Thomas de Feckenham, is mentioned in course of a trial at Worcester; in 1458 Robert did notarial duty in the diocese. Howman was the family name; Feckenham marked the birthplace, a village near Droitwich. Lee, on the authority of Clemens Reyner, says the education of the abbot began in the Benedictine Abbey of Evesham, was continued in Gloucester Hall (whither he was sent at 18); he took his degree in 1539. He held, for a few months, the rectory of Solihull, and was awarded a

yearly pension of 100 florins on signing the deed of surrender which allowed the secularisation of Evesham. The abbey had been endowed in 701 by Bishop Egwin, and in 34 Henry VIII. was worth £23,000, a handsome gift to Sir Philip Hoby. John, successively chaplain to Bell (Bishop of Worcester) and Bonner (Bishop of London), incurred the suspicion of Cranmer when Bonner was sent to the Marshalsea, and was imprisoned (it is said at the instigation of Horne, Bishop of Worcester) without definite charge. His detention lasted two years, and was relieved by a curious incident. He was "borrowed" from the Tower by Sir Philip Hoby to dispute at various places with distinguished Protestants who thought their faith could not be denied; he was returned to the Tower. Prebendary of St. Paul's in 1554, and, later, Dean, he had reputation as a preacher, and was admitted D.D. at Oxford in 1556, "being in great respect for learning piety and charity." In the same year he was, by Cardinal Pole, consecrated Abbot of Westminster on the restoration of that see. Much as Elizabeth respected him (and with good reason, for during Mary's reign he had pled for Protestants, especially for Elizabeth), she could do nothing for him—the question of her own legitimacy was far too personal and pressing an anxiety; besides, he disputed the legality of the First Book of Prayer, and still more her supremacy over the Church. It is said, on no better evidence than that he had a private interview with Elizabeth, that she offered him the see of Canterbury on condition of his becoming a Protestant. In 1559 the see of Westminster was finally abolished, and the abbot, who persisted in his natural disapprobation of the changes, was imprisoned in 1560, allowed in 1563 to reside in

Holborn, and founded a hospital at Bath. In 1571 we find him a ward of the Bishop of Ely (of Horner, Bishop of Winchester, according to Wood). In 1580 he was in residence at Wisbeach, either by choice, or sent there as it was unhealthy; in 1585 he died.

The title of his compilation betrays the benevolence and modesty of the author: "This Booke of soueraigne Medicines against the most common and known diseases both of Men and Women was by good proofe and long experience collected of Dr. Feckenham, late Abbot of Westminster, and that chiefly for those who have not alwayes the learned Phisitian at hand." He recommends only those remedies which have a reasonable prospect of doing some good. He makes sparing use of strong drinks as the vehicles of his drugs, and is singularly modest as to the result, leaving to God the success or otherwise of the remedy. This contrasts with the rector's "*erit*" at the end of receipts; he does not admit the possibility of failure, whether his dogmatism is due to conceit or to credulity. The abbot is largely concerned with ague, plague and gout. Those who know a fit of the last may feel thankful that they are not the victims of the happy-go-lucky herb doses which leave to nature and time the alleviation of pain and the gradual abatement of the cause. But that was not the abbot's fault; his treatment was at least cleanly, not like the rector's.

Among the very few cures whose motive it is not easy to understand, is this for the abatement of the swellings in plague: "Pluck bare the rump of a cock chicken and apply it to the part; if the first chicken dies take another." A man used thirteen—the last, and the child, survived. To this adheres the test of scrofula given by

various early writers: put a caterpillar on the skin under a cabbage leaf; if it is scrofula, the caterpillar will die.

Several medical men are mentioned. Wendy, a student of Gonville, Cambridge, where he was incorporated in 1527, his degree being a foreign one; he was physician to Henry VIII. and his three successors; he became Fellow of the College of Physicians in 1551.

Young and Stephens also occur as mere names. Feckenham is mentioned by the rector as stating a way to detect a thief, but their common association with Evesham has nothing to do with this.

A more intelligent man than the rector, one better instructed than the abbot, wrote a collection in which the theological is greater and more interesting than the medical element. Texts are discussed, moral reflections engaged in, infant baptism considered. Riverius, the French physician (1589-1665), van Helmont, the elder (1577-1664), are quoted freely. The names of patients and of authors of receipts are Welsh or from border towns. London physicians are cited, many are common to this and the rector's book, as Willis, Smith, Roger, Bate, Butler, Stephen, Allen; but Danby, Coulson, Matthias, Dansy, Blackford are peculiar. Some of these are surely doctors by courtesy, as they are not in the *Fasti* nor in *Munk*; but some of the formulæ are even elegant. The treatment is still constitutional: plasters cure fistulas, herbs break the stone and prevent plague, just as pills are said to do now. The chief interest is the "*Declaration of the Faith, Purpose and Way of the Church of Christ at Westbury, Wilts*, by Mr. Philip Hunton, pastor there." Hunton had been an Oxford man. In 1657 Cromwell revived the College, founded

in 1290, at Newcastle, and suppressed by Henry VIII., the living of Sedgefield being attached to it as emolument. But 1660 brought back the incumbent, and ended the College. Hunton returned to Westbury, but not to peace, for in 1662 he was turned out as a non-juror, and thereafter preached privately, as Calamy courteously phrases it; held conventicles, in the less civil language of his latest biographer. The *Declaration* dates between 1662 and 1682, when Hunton died. It is beyond my province and power to comment on this document, but it is permitted to an outsider to express surprise that men so acute should have emitted a statement which depends for its meaning on the authority of the interpreter, and leaves everything to the pastor, who seems self-elected. One feels almost glad to recognise human weakness in a discussion of dreams wherein those are indicated to which credence may be given. Yet it is a company of ghosts that one meets, names familiar, but to which no personal interest attaches, none at least with certainty. One hails Bishop Usher though he is in such unexpected company.

Yet another independent claims attention, one who knew the same people as did Hunton, quotes the same authors, especially Riverius, and preaches under Lady Latimer's testament, 1651. He gives some notes which are more indicative of his shrewdness than clinically valuable, though they refer to the epidemics of 1651-57-58; but his remarks on the treatment at, and after parturition, are sensible. This parson began to write at both ends of the volume, meant to indite a commentary on all the books of the Bible, but did little more than head the pages, so busy was he with practical piety and medical cares; it ended as a commonplace book.

Sir Kenelm Digby appears, with Drs. Willis, Allen, King, Cox, Thom, Gilbert. Is Lady Hoby one of the Evesham family? The pastor was not so good a gossip as the rector; on the other hand, he is not so superstitious, and, if he is archaic in his account of the colours of urines, he is judicious in his remarks on the convulsions of children.

I have no adequate answer to the question who tended the poor, or who looked after those who had neither poverty nor riches. Of these the profession is not usually negligent; yet medical history has more to say of the attendants on royalty and wealth. It is natural, since from the upper grades of the profession was to be expected all that would forward the practice by sound theory based on educated observation. One regrets all the same that so little survives of the personal history of the ancient Gideon Grays, who toiled in the acquisition of experience, and are now remembered only by the cheap witlings who read their receipts with the contempt born of imperfect knowledge. If the profession had as little to attract as Burton would have us believe, the blame rested with the clerical profession, whose learning or genius failed to point the road to more solid gains of knowledge.

A DISCOURSE

DELIVERED IN TRINITY CONGREGATIONAL CHURCH, GLASGOW

[Date 1900]

"Thou hast made them fast for ever and ever, Thou hast given them a law which shall not be broken"; these words of the 148th Psalm sum up one of the explanations of the Cosmos or order of the universe. The alternative is a mechanical or dynamical theory which seeks to find in Matter adequate account of that order whose source the Psalmist recognised as supernatural, relying on the revelation given to his race.

The mechanical theory is set forth as resting on the basis of science. I propose to enquire how far the authority of science may be legitimately cited in this sense. In former times the argument for design was burthened with the attempt to prove that from observation alone might be inferred not merely the existence of an Artificer but also his attributes. This attempt to carry science into the province of religion failed, and the argument suffered by the fault of its advocates. Now it is sought to place on the basis of science the contrary proposition, that there is no Artificer, Matter alone containing in itself all that is needed for the establishment and maintenance of an orderly universe.

This wide conclusion following on the alleged scientific proof, this notion that all the planetary bodies and their motions, the origin of life and the growth of society, the colours of the opal and the highest efforts of the human imagination and intellect, owe their existence to the mere laws of Matter—it is this that I would examine.

Paley has suffered much, and wrongly, at the hands of modern writers—of all save one, Huxley, whose profound knowledge of nature and acuteness of intellect made him a leader of thought, while his accuracy enabled him to avoid some errors, especially that of misrepresenting opinions he dissented from: he took care to understand before discussing them. He recognised the true value and meaning of Paley's argument, and, while seeking to minimise its influence, did more than any one to vindicate Teleology as an essential part of the Evolutionary theory.

Now the doctrine of Evolution starts with a "primordial molecular arrangement of which all the phenomena of the universe are the consequences." This Paley admitted. But the sequence of the phenomena is now put under the control of another principle, that of Continuity. This means that the succession of antecedents and consequents shall at no point be broken, that in tracing consequents to their antecedents backwards in time we shall nowhere pass from material to immaterial, from that which is under relations to that which is free from relations, from the Conditioned to the Unconditioned. Those who limit thought by this principle assert it as the duty of science to postpone as far as possible any interference with the orderly succession of phenomena which, invoking a spiritual agency, shall

partake of a miracle. But the point is at last reached when experience fails us, when we cannot devise a material antecedent to the remote consequent with which the Cosmos began. We must then admit an "insoluble mystery," or appeal to unknown laws of matter, which, being unknown, might as well be spoken of as spiritual. Tyndall felt the difficulty and took a strange way of evading it—"Believing as I do in the Continuity of Matter, I cannot stop abruptly where our microscopes cease to be of use. Here the vision of the mind supplements the vision of the eye. By an intellectual necessity I cross the boundary of the experimental evidence and discern in that Matter which we in our ignorance of its latent powers and notwithstanding our professed reverence for its Creator have hitherto covered with opprobrium, the promise and potence of all terrestrial life." This utterance, which is distinctly theistic, is marred by the mental confusion it betrays, for he goes on—"Considered fundamentally, it is by the operation of an insoluble mystery that life on earth is evolved, species differentiated and mind unfolded from their prepotent elements in the immeasurable past." Need it be remarked that if there is an intellectual necessity there can be no mystery, no operative mystery (whatever that may be), the same thing cannot be at once inscrutable and obviously true.

Huxley speaks of "the fundamental proposition of Evolution that the whole world, living and not-living, is the result of the mutual interaction according to definite laws of the powers possessed by the molecules of which the primitive nebulosity of the universe was composed. If this be true, it is no less certain that the existing world lay potentially in the cosmic vapour, and that a

sufficient intelligence could, from a knowledge of the properties of that vapour, have predicted say the state of the fauna of Great Britain in 1869 with as much certainty as one can say what will happen to the vapour of the breath on a cold winter day."

This was said in comment on Darwin's hypothesis: and as Darwin regards evolution as only "the aggregate and product of many natural laws," those laws being "the sequence of events as observed by us," both writers may be held as concurring in the view that Evolution is in its essence a mechanical process, which, if logically followed out, leaves no room for, though it does not expressly exclude, the intervention of intelligence. Mind is thus left in the position of an interested but unnecessary spectator.

Continuity, then, rests on "the powers possessed by the molecules of the primitive nebulosity," and as nothing can be got out of molecules save what has already been put into them by thought, the mechanical theory rests not on science—*i.e.* organised observation—but on a mental abstraction. J. S. Mill has said—"The word Nature suggests not so much the multitudinous details of the phenomena as the conception which might be formed of the manner of their existence as a mental whole by a mind possessing a complete knowledge of them: to this conception it is the aim of science to raise itself by successive steps of generalisation from experience." Induction has, however, been set aside, and, in place of the generalisations contemplated by Mill, the order of Nature has been treated deductively: truly, the metaphysician has been more loyal to science than have been her own votaries.

Does, then, experience justify the assertion of Con-

tinuity? At the threshold of the enquiry we find ourselves called on to choose one of two divergent opinions. We may endow molecules with all the powers needed, or we may recognise that the first motions of the initial atoms were due to an impulse from without, to the bidding of an intelligence able to foresee the working of the powers thus conferred. There is no third way. Yet, are not these two in effect one? Our intelligence attributes, the Supreme Intelligence bestows powers: unless these two intelligences are supposed to belong to unlike categories, the ultimate analysis leads us to that Intelligence of which our own is a feeble reflection, capable of that foresight which Huxley put hypothetically, which Paley recognised as, nay, claimed as the First Cause, of which the Insoluble Mysteries, the Unknowable, the Unconditioned are variants.

But Evolution has been traced to "a homogeneous indefinite something" whose changes (integrations and differentiations) have resulted in the existing complexity. It is difficult to realise an "indefinite" something which is at the same time "homogeneous," hard to be asked to accept this as the basis of definite knowledge. Nor does the homogeneous indefinite something, assuming that it could exist, square with what we learn from science. Experience tells us that this world had a beginning, warns us that it will have an end. Science tells us that the transformation of energy cannot go on indefinitely: that the dissipation of energy diminishes the total amount available, and that the time will come when all will be reduced to a state of uniform temperature, whose uniformity, be it high or low, will forbid its raising itself into a higher form of energy. The homogeneous is rather the end than the beginning of things.

If, then, we cannot account for the commencement of the Cosmos without a breach of Continuity, shall we be certain of finding Continuity in other directions?

The origin of organic matter is not within the domain of Chemistry. The organic compounds have been imitated synthetically; but no synthesis confers on them Life, the power of raising inorganic matter into organic, of their own motion. The crystal enlarges (if you prefer to use language of double meaning, you may say grows), but the growth is merely mechanical accretion, there is no alteration of the material used. Spontaneous Generation might save the principle of Continuity, but that is a dream, not even a chemical dream: the supposed instances of it are found to be due to errors of observation. The hypothesis is unproved, rejected (it may be with regret) by those whose contention it would serve. We do not know that any physical laws add or permit the addition to the sum of organic matter now existing.

But the breach of Continuity most nearly concerning us is the advent of mind in the human being. That Man is physically of the same stock with the lower animals, is a proposition no one nowadays will care to deny. That his mental endowment separates him from all the lower animals, even the highest, is likewise beyond contradiction. The only question is, could the distinctively human quality of mind be in any sense traceable back to the lower animals? do any of them offer analogy to the human mind? That is a question which only ultra-logical advocates of Continuity will answer affirmatively. Various attempts have been made to show that thought is only, is not anything more than a register of sense impressions: that these being possessed by the lower

animals are inherited by man in virtue of natural selection, and improved in transmission. The intelligence of lower animals has been glorified with the hope of thereby bridging over the gulf, but until it shall have been shown that any one of these animals has the power of forming conceptions, of formulating successive generalisations from experience, and finally giving names to the products of such generalisations, we must hold that the gulf is complete. "Ideas when clothed in words are not sensible objects but mental constructions," and Lewes is beyond the suspicion of favour for aught having the remotest approach to suprahuman suggestion.

Having sketched the lines of argument tending to show that Continuity is an unsatisfactory guide through the complexities of the Cosmos, we turn to the organic world and ask if there we may hope to find reason for believing that mechanical theories rather than intelligence had exclusive influence in securing the order presented to us.

It is a common but erroneous notion that Darwin has satisfactorily accounted for what we see, and has furnished additional evidence in favour of the supremacy of mechanism. Happy as was his hypothesis, stimulating to thought as few scientific conjectures have been, it is still on its trial. Its very purpose has been misunderstood by its adherents. After its first announcement its author had occasion to strengthen it with additional hypotheses, for the most part equally happy: but it is still on its trial. It does not explain variation, but, given that variations occur, it shows how they may become permanent. It is not a causal but a modal explanation, has nothing to say to the "why" of variation, only deals with the "how" of continuance. The

first assumption is that, if variations occurred,—chanced to occur, chance being a brief term for "unknown causes"—if the variations were useful, for utility is essential to the endurance of variations, they might be preserved and improved in transmission. It was further assumed that the variations were slight, and (in later statements of the hypothesis) affected a considerable number of individuals so as to give them a chance of survival. But a new school is raising doubts as to the necessity for slow, small variations: it brushes aside the dictum, "*Natura non facit per saltum.*" Even the term Natural Selection has been questioned by others, as, though a convenient brief phrase, it is apt to bring logical complications in its train. We know what the breeder can do, how he deals with animals favourably situated for the perpetuation of their race and of individuals in which desirable variations may have presented themselves. But whereas the breeder deals with single traits whose variations cannot, under such conditions, affect the general wellbeing, nature has to deal with the sum of characters on which depends not merely continuance of life but capacity for multiplication. The change of a single character may or may not affect one or other of these requirements. If it does, the balance can only be restored by aid of other suitable modifications: these are the correlated changes to which appeal has been made in the difficulties of natural selection. If the correlated changes occur after the variation, they must be dictated by something within the animal, a conjecture which multiplies the difficulties of the solution. If they take place along with the variation, they are identified with it, and it is the more likely that nature by one stroke brings about changes

affecting several parts and functions of the economy, acts by abrupt modifications rather than by small, slow variations demanding incessant adaptations. The controversy now beginning recalls that earlier in the century when one school of geologists believed that the intervals between successive periods or formations were marked by catastrophes which terminated one order of things, making room for another. Then came the assertion of uniformity of natural processes with denial of catastrophes. Between these two schools the controversy was long and bitter, until the errors of both, due to exaggeration, were recognised, and the *via media* was found, the truth accepted, that both processes were in the order of nature. The catastrophe, now known to be local, represents the accumulation of energy during long secular changes, accumulation which at length overbears restraint and ruins a tract, usually a small one. The devastation even of a large area by flood or earthquake does not mark the end of an epoch in the history of the earth, only in that of the area affected, elsewhere the history follows its even course. A few years will probably see the end of the biological discussion now beginning, and it will likely be on the same ground of compromise.

If, then, the speculative side of the mechanical theory is unsatisfactory, if Evolution cannot give better security that it stands on an assured basis, if the Darwinian hypothesis, in itself a particular case of Evolution, owes such confidence as it has inspired to the fact that it deals only with the world as it is and shrinks from the problem of origins, may we look to the organic world for evidence of design? That design should be proved, advances us little for design explains nothing. What it

is desirable to impress is that, in the absence of a solution which shall account for the origin and progress of every step in the beginning and development of organisms, it is worth while to seek for the grounds on which we may venture to initiate the successive generalisations from experience deemed by Mill the province of science. Some are content with mechanism, others feel imperfectly instructed by such an answer: failing facts, we are thrown back on reason, and we find that personal character has much to do with the kind of answer deemed satisfactory. Those who find design adequate to their conception of the Cosmos have as little justification for reproaching the advocates of mechanism with limited capacity as these in turn have for hinting the intellectual limitation or doubtful honesty of their opponents.

Parasitism and the division of labour among the members of some insect communities are arrangements which no application of natural selection will aid us in accounting for. That a parasite should find its advantage in shifting from one animal to another during its development, that in each successive host it should pass through a new phase of activity and suitable form, and that in the last only it should acquire the power of multiplying, all this adaptation of means to ends is more than can be credited to mere natural selection. If anywhere we could find proof that the result had been obtained by tentative efforts, deliberate trials, if failure could be a step to success instead of ending the possibility of further experiment, we might believe that the strange order was so obtained. But there is no such evidence, the steps cannot be the fruit of experiment, for the adaptations must be precise just at the points where there is

no conscious knowledge or choice on the part of the larva. It is not the larva which reproduces its kind, but the adult after and because it has passed through all the previous stages and hosts—the right hosts. Thus an insect places its egg in the body of a larva or in the same cell with it, and the adjustment is sufficiently precise that the parasite is sure of an adequate food-supply, at the right time, at the cost of its victim, which is also its foster-mother: the two make equal advances towards maturity. Experience should in this case be acquired before the individual was in a state to learn: experience could not, therefore, be transmitted—not even the negative experience of failure due to the choice of an unsuitable host: there is nothing, in truth, left to guide the next generation. If this were all fortuitous—if, as we are told, all this was fortuitous, mere chance, we might well turn on the exponents of unknown causes and ask why should reason again have the door slammed in her face by the dogmatic assertion of the unknown, the suggestion of the unknowable?

Not less striking is the distribution of workers in a colony of bees, where the selection (if there is selection) of eggs and their treatment for their future destiny is either an effort of wise discretion or implicit obedience to an impulse which certainly was never conceived in the nervous system of the insect: the duties of the neuter are not hereditary, it is barren.

We have here, no doubt, extreme cases from a field in which physical sequences do not suffice: these carry out, do not dictate the scheme. They serve to emphasise the need for taking into account the other half of the universe, if we would approach Mill's ideal, the conception of an intellectual whole which he sees possible

amid the complex details of nature. In face of this, in response to our quest of this, we have dogmatism as fatal to thought and even to enquiry as the Final Causes against which Bacon is erroneously credited with having directed his weighty censure: it was the spirit in which they were asserted that he denounced, the scholastic arrogance repugnant to his sceptical attitude. Against a similar arrogance it is now necessary to protest. And the protest is the more needed that "freedom from prejudice" is the motto under which it conceals itself. If it is counted evil (prejudice) to assert the existence of an Author of the world concerning whom we may at least have some beliefs, what shall be said for the demand that we should accept instead something, we know not what, save that we know nothing regarding it, can have no beliefs of any sort? The assertion of incomprehensible causes is not an appeal to reason, it is the assertion of authority.

All things are set down to Evolution, and most people have been led to believe that this is the same thing as the Darwinian hypothesis, under which the co-operation of all is disguised under the strangely misused metaphor "struggle for existence," a metaphor drawn from the life of mammals and now abandoned even by its author. Now Herbert Spencer's Evolution is a Law, Darwin set forth a particular case of that Law: hence the latter may result in progress, the former contemplates progress as its essential: the two, therefore, have little in common. But Evolution implies design, and the language of those who adopt it as an escape from the necessity of admitting mind to a share in the world betrays that implication, while philosophers wonder that those who use the word as a shibboleth do not see what it involves. The thing

evolved must have existed somewhere, not in material form, for we see in part and can infer the steps of its genesis. In thought it may have existed, in that intelligence which Huxley supposed might have foreseen the present in nebulous chaos.

Human reason is distrusted by some because of its supposed origin in the lower stock in common with which man's physical descent started. Now we know, so far as anything can be affirmed as known regarding the lower animals, that they never rise above sense-perceptions. But these, multiply them as you will, are not in the same category as conceptions, the subjective presentations of generalised sensations. The effort to establish Continuity between the mind of man and the intelligence of mammals by means of imaginary savages having no language save that of signs, or by means of hinted analogies between these hypothetical persons and the performances of parrots, is unscientific, unphilosophical, and demonstrative of grave argumentative straits. To make even such arguments possible a further liberty is taken, and it is declared that speech is only a higher kind of sign-making, that speech is prior to conceptions, is the condition not the servant of thought. Vivid and weak sense impressions as steps in the passage from sensation to thought would be valid if it were proved that sense impressions are concepts.

Among the points at which Continuity breaks down, mention has been made of the gap between inorganic and organic matter. But change in the inorganic has been described in the language of Evolution as if the increase and diminution of matter and its alteration—which are of the essence of organic change—were the same thing as, nothing more than, the readjustment, without change,

of inorganic matter in crystalline or other definite form. The equivocation is as frequent as it is obvious. But mischievous nomenclature has been carried one step farther back. To atoms is attributed, by a mental abstraction, sentience, and their readjustments are then easily described as illustrations of natural selection. One is lost amid these wild aberrations, and can only regret that so many writers on biological and physical questions are ignorant of the laws of thought as they are careless of the superficial meanings of words.

Organic and inorganic changes, fundamentally unlike, go on concurrently, obedient to their respective laws, and contribute towards the harmony of the whole. They pursue separate courses which yet, from our point of view, converge on one result, the well-being of living things. It may be that man is the final purpose of all this harmony, it may be that the final purpose is beyond our ken! Of that science can say nothing. But the harmony is so striking that one cannot credit it wholly to chance. The series of consequents are enormous, their points of agreement so rarely coincide, the sum is so constantly an average of agreement that one fails to find response to the doctrine of chances; in a world now of such antiquity there are no such recurrences as probability would lead us to expect. Is there no suspicion of design in the adjustment of means to ends, in the fact that adjustment happens? We have only bald dogmatism to prevent its reference to the dictation of mind.

It is said that Darwin has set in clearer light the true Teleology: on enquiry this resolves itself into the mere restatement of the fact that adaptations do take place, that ends are reached by appropriate means: nothing more. The means are mechanical, the ends have no

higher origin. This may be satisfactory to those who are content with mechanism, but not to those who seek the highest answer that science may venture to aim at, the answer which it is the duty of science to attempt. Mill enjoined successive generalisations from experience: but when the farthest limits of experience are reached, and its language is no longer available, it is still possible to formulate, if we keep in mind that an intellectual whole is contemplated, an explanation drawn from that other half of the universe which is so strangely utilised to prop a detail in an argument but ignored when a general theory is desired. Motion is explained by means of ether; but that is a mental device, not conceivable if conception is limited by experience. We hear a sound and respond to it: we hear an articulated sound and act on the meaning of the words, though the full meaning of these words to our minds would require for its description a time vastly longer than the interval between our hearing them and accomplishing the proper responsive act. What intervenes between hearing and action, we call thought. The succession is within our experience, but the unseen phenomena we can neither imagine nor conceive: there is no mechanical equivalent for them. We do not know how thought is linked with brain, if it is linked. I speak as if it were uncertain, for this reason: Mind, self-conscious Mind, traced up from its dawn in early childhood has been held as within the domain of natural selection, and on this assumption has been founded the expectation that, like other of our inheritances from the lower stock, it, too, may be followed up from a lower to a higher form. But this is based on a false analogy, or rather on a fanciful resemblance: there is no intellect of the human sort in the lower

animals from which the human possession might be traced. Embryology furnishes us with the skeletal framework which we see modified in transmission (to use the customary phrase), which we may verify in the youngest embryo. There is no such mental framework, no such basis of comparison. Even the assumption of it is barred by our ignorance of what passes in the infant. We may think to fall back on the development of brain; but though in that we perceive a certain kind of progression, we are no whit helped to understand the relation of thought to that brain. Say that the child has intellect by inheritance through countless generations, it yet learns from those in the active exercise of thought the proper forms in which to clothe its thoughts. We do not know that the child forms intellect for itself: we know that no animal has done so. It may be that in the child self-consciousness had no beginning, that contact with active intelligence only stimulated its manifestation: if so, we would be the more led to seek for it a higher than a lower origin.

Here we find ourselves with two alternatives: that of the metaphysicians as Maimonides, who find the soul (the mind) a part of the Universal Intelligence: the other is offered to us by Religion.

THE MAKING OF A BOOK

[Date 1899]

Richard de Bury, Bishop Palatine of Durham, a friend of Petrarch, was as the voice of one crying in the wilderness when, in 1345, he uttered his eulogy on books as "the masters that instruct us without rod or ferule, without reprimands or anger, without the solemnity of the gown or the expense of lessons." "The glory of the world would be buried in oblivion had not God as a remedy conferred on mortal man the benefit of books." While the provision for the multiplying of copies so that Saturn should not feed on his children was abundant, few probably regarded the volumes from so lofty a standpoint: and though Hallam (*Lit. His.* I. 55, 79) speaks lightly of the third Edward's chancellor as a scholar because he had more interest in than knowledge of classical learning, we owe him some regard for striking so high a note at a time when books were comparatively few, ecclesiastics arrogant. After more than six centuries we cannot rise to the same enthusiasm; we can only say that books are our best friends—on the whole. The drawbacks are that they provoke us to wrath, tempt us to the indulgence of crotchets, lead us into extravagance, or cultivate in us vicious acquisitiveness. What bookman does not sympathise with the unhappy Don Vincente, who killed the purchasers of books that he

might regain possession of the precious volumes? Perhaps (let us hope) his was an extreme case: it is not for me to pass judgment on the secret thoughts of a booklover.

Happy he who, having the care of a rich collection, is saved from extravagance, can indulge his crotchets under the guise of duty, and, provided the library is varied as well as rich, seldom feels the pangs of envy, never is tempted to murder. Such is my position, and I am happy in being thus safeguarded against the noble vices of the collector. William Hunter, whose portrait I prefix to this address, was no ordinary collector—his library, even in those days of fine libraries, was famous, and is still visited for MSS. which do not occur elsewhere, while his early printed books are an endless joy to those who have the privilege of living with them. The portrait is unpublished save for an impression which Dr. Hingston Fox prefixed to his monograph with permission: judging from the Pine portrait in the Library Hall, it is an excellent likeness by an unknown artist, in some respects superior, I think, to the medal executed at a later date.

My pleasure is marred by one pain: few nowadays have respect for a book because it is a book. Sweet Susan Winstanley taught her lover that the woman was to be respected, be she heiress or laundress, and I could fancy that Lamb, in telling of the lesson, had lurking in his brain some of the quaint memories gathered in his "Detached thoughts about Books and Reading," or poured forth in his epistolary lamentations over broken sets, the consequence of too great trust in his friend's honesty and affection for the books whence he had borrowed one. Only in Coleridge's favour does he

WILLIAM HUNTER.

permit himself to imagine the possibility of pardon for the man who writes on a book. Alas, no one nowadays thinks of donning his best attire to fit himself for sitting down, with Machiavelli, to read a classic: too many seem to think that the ink which has spoiled white paper warrants further ink or pencil marks—a few more won't count. A man who inveighs against carving his name on an old tower or advertising Beecham's Pills on the Pyramids sprawls his name without shame or scruple over the front page of an Editio Princeps, or adds his gratuitous follies in indelible pencil to the text, be it wise or foolish, of a volume which is not even his own. Akin to the ruffian who thus damages a book and spoils the pleasure of him who comes after, stirring up his passions to profanity or homicidal impulse, is he who cuts up a new book carelessly, not bringing the knife up to the back—(such a scoundrel usually takes a sharp steel knife as more certain of doing mischief)—or drops egg or coffee on a volume which, as his companion at a meal, is entitled to civil treatment.

Truth is, there are too many books, and familiarity has bred the usual consequence. In the introduction to *Quentin Durward,* Sir Walter Scott sympathetically descants on a ruined library in a French chateau—"When I see a book thus shamefully misused, I sympathise with Dr. Dibdin, who envied the powers of the Church, so much did he long to launch an anathema at the heads of the perpetrators."

If we think of all that goes to make a book—the author's share is at present of no consequence—of all the thought, skill, labour, which have brought a printed volume to its present standing, we shall learn at least to

respect the work of art, and treat it as we would a marble statue, on which one is not wont to inscribe frivolous impressions.

The prehistoric man of France has left record of the chase on a bone which is thus the first of the Badminton series. After him comes, at a long interval, the historian, who, with quaint faith in the permanence of a mighty empire, inscribed his chronicle on the palace walls. More convenient were the clay, the waxen tablets, the burnished metal plates, which later scribes employed. Over these we need not linger, but rather turn to him who used the skins of animals for the permanent record of his debts or feelings.

Skins were early made use of. Herodotus speaks of them as familiar, the Ionians transferred to papyrus the term *diphtherai* which designated their coriaceous material, the Jews inscribed the law on leather. Skin was a handy material to the nomadic folks.

Papyrus was the rival of skin, but the two coexisted and even now we use parchment (often a miserable fraud of blotting paper and sulphuric acid) alongside of paper. The earlier materials have left their mark on language. Parchment is the modern form of *pergamena* which Eumenes of Pergamos not invented but improved, *c.* 180 B.C., the improvement being in response to the churlish rivalry of Ptolemy Epiphanes, who checked the export of papyrus from Egypt in the hope of starving the library of Pergamos, the competitor of that in process of formation at Alexandria.

Parchment is elastic in meaning as it is varied in source. At first the skin of calves, when vellum is the usual term; then other animals were requisitioned. Pigskin was a frequent medieval binding, not

wholly unknown for the volume bound. The currier's skill was early developed; but no skill could efface the difference between the two surfaces—the outer showing the roots of the hairs, the inner, that next the flesh, being smooth, and therefore first used for writing.

Of papyrus, too, one side was written on. The bast or rind of the reed was called *biblos,* a term lingering in *biblion,* a book—bible, the book of books. The sheets were placed in pairs so that the fibres ran at right angles to each other,—then they were steeped in the slimy water of the Nile, becoming glued together while drying; or the single sheet might be backed with parchment. But, written on one side, skin or papyrus was rolled as the writing was finished, one sheet being fastened to the edge of the previous one, and the reader unrolled the lengths which made up the continuous volume till, when he had come to the last, *explicit,* the final unrolling, became the synonym for conclusion,—is still so used though the sheets are in tablet form. The Roman *liber* similarly preserves memory of the first material, the bark of a tree; and *folia,* leaves, go farther back to the time when palm leaves were the handiest surface available.

Papyrus held its ground till the VIII. sæc., slowly giving way before paper, till at last the Papal Bulls, the most conservative of documents, ceased to be written thereon after 1050. Vellum-backed papyrus did not survive the Merovingian rule.

Outside of China, paper was first made at Samarcand 706 or 750 A.D., and was a precious article of importation into Europe till the XI. sæc, when its manufacture was commenced in Europe. England did not share in the trade till 1490, when Hertford entered on an uninterrupted career, the first mills being started by Tate.

The Samarcand paper was of cotton (*charta bombycina*). Linen was early employed in Europe, had been even used in web so early as 440 B.C. for the record of certain accounts. The economy of linen rags, their utilisation for paper-making, did not come till near the end of the 13th century A.D.

As books multiplied, the need for them increased; both sides of the sheets were required, and the tablet form, as more economical, was resumed, for the *volumen* had displaced the *tabula*. Certain documents, as Bulls, Decrees, Warrants, Covenants still retained the one-sided form. In the Mitchell Library is a fine skin containing a copy of the Solemn League and Covenant, a mystery, for no reason can be found for its being unsigned: even the usual explanation, a fraud, will not do—frauds have a limit in cost, and the document is contemporary with the Glasgow Assembly. On the other hand, the drafts of Queen Elizabeth's Proclamations are on slips of parchment which they do not quite fill: like the writs of bygone days, perhaps they still survive, for law is tenacious of custom. When a continuous treatise had to be written, the skin was folded, the hair or fell side being the outermost of the gathering. A skin folded once—a folio, had two flesh sides opposed, two fell sides external; but this was reversed in Greek MSS. So long as new skins were used, we can easily tell the composition of a book, whether it was of whole skins: can even guess fairly well when a clean has taken the place of a spoiled sheet. But if skins were too few, old writings were sponged off or polished off with pumice stone, and these palimpsests sometimes betray the lost document or documents, when, as in a recent find in Syria, more than one layer of writing is detected. Perhaps

the lament over lost MSS. is exaggerated. Protestantism is always ready to throw another accusation at the monastic system. Now, as the monks were long the sole scribes, always the chief scribes, monastic accounts (few of which survive) are as likely to have been cleaned off as any other writing, perhaps more likely because handier: it does not do to fancy a classic in every defaced sheet: mischief enough has been done, do not let us add injustice.

For nearly seven centuries the monasteries were the strongholds, the monks the guardians of learning: the "clerk in holy orders" is a titular survival of the time when every priest or aspirant to the priesthood was a clerk, whether he could write or not. There was in the early days great zeal, but not always great honesty—learning does not invariably secure rectitude: books were, like horses to-day, the merchandise which led men astray. Even Saint Columba borrowed a MS. and had it copied without leave from the regal owner. When reluctantly compelled to restore the original and the copy to this sturdy advocate of an early copyright, the saint paid him out by political opposition. I think he got him killed—anyhow the memory darkened Columba's later days with remorse: that saint lived too soon, if the story is true.

The machinery for the writing of original, the copying of older documents, was well devised and skilfully carried out. Labour in the *scriptorium* was the equivalent and the alternative of labour in the fields, and if any one who jeers at monastic idleness tries six hours' daily work, writing without pause except at meal times, and does this for six months, he will think and speak more respectfully of monastic labour thereafter. The work of

the scribe was his contribution to the welfare of his house, a pecuniary contribution.

The Benedictine Rule, the most unpopular at the present day in this country, was perhaps the most thorough and successful. Monte Casino, in Campania, is a fine example of such institutions. There were separate cells for the scribe monks, 14 at Clairvaux: in the *scriptoria* or common writing chambers there was an elaborate system for the supply to each scribe of what he needed, signals which rendered speech unnecessary. Dictation was no doubt practised when several copies were needed and each scribe could not have his own text. But individual transcription was the rule, and critical ingenuity has been stimulated by the study of texts, to ascertain if possible the source of errors. Those due to similarity of sound are unlike those due to similarity of aspect of the original, and phonetic errors call for a higher skill, more instructed imagination, than the blunders of the ignorant, the careless, or the wearied scribe. Large sums were earned for the monastery by this work, for which our gratitude ought to be rendered. Literal transcription was a sacred duty when Scripture was concerned; but in other cases, Cassiodorus laid down a dangerous rule: *ubicunque paragrammata in disertis hominibus reperta fuerunt, intrepidus vitiosa recorrigat.*

The preparation for work had need to be careful so as to ensure accuracy and economy. The margins were pricked off, and the lines drawn accordingly: the pages were thus exactly like those of the original, and we see where by wide spacing or greater compression the scribe had miscalculated his space. For payments—at least later—were made on a scale for work done.

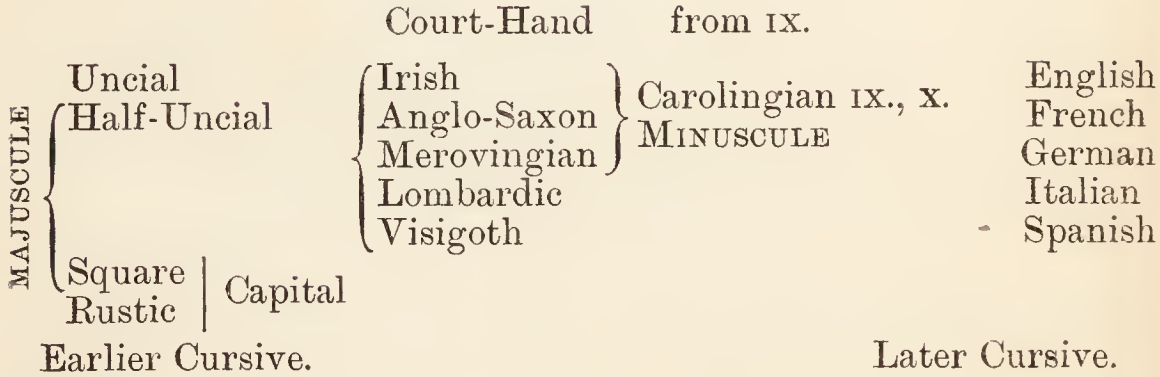
By stichometry, payments were calculated and material provided in sufficient but not extravagant quantity. An average Homeric line was the standard—*i.e.*, 15 or 16 syllables, 34 or 38 letters. The number of leaves, too, was noted. Latin was measured on similar principles. At Bologna, 16 columns of 62 lines each, 32 letters to the line, was the standard: just as to-day the law stationers pay by folia of 72 or 100 words, or the typewriters, who are superseding them, by the 1000 words. This was mere space or surface measurement. Another principle rested on divisions according to the sense, the cola and commata, the latter being not more than 8, the former than 17 syllables. Roughly accurate these were, yet individual variations were possible, and are seen in MSS. of the Bible.

The outfit of the scribe is shown in many illuminations, all except artificial light, which in the main was seldom needed, and when needed plaintively lamented. The scribe was very sorry for himself, and probably with reason, for the lights could not have been lavish or brilliant. The Bedford Hours shows a scribe on whose labours a fiend tries to intrude; another shows him ministered to by fishes, who supply ink from their mouths—but no miracle will get ink from haddocks, though pennies were once got: the notion of cuttle fishes was natural at the time, the error intelligible in an inland *scriptorium*.

The fluids were ink and water colours. In Imperial times the parchment was tinted, the MS. variously illuminated; on a MS. of Virgil the portrait of the poet is said to have been placed, and Varro introduced portraits to the number of hundreds into this work. In monastic times the scribe stuck to the text, leaving space for the

illuminator, who might be a fellow worker, or an artistic monk brought from elsewhere. Of the black ink we may be certain, it still glows; the greens and browns may be due to alteration through time.

The scribe sometimes put a small letter in the space left for the capital, as a guide to the illuminator, who exercised his own taste and skill within the limits allowed by the taste of the time and place. The letter was perhaps floriated or accompanied by a miniature, a term which recalls the original material, *minium* (red oxide of lead), with which the subject was sketched in. At first the drawing was completed in red, but later other colours were used in addition, and the schools and epochs were marked by the prevailing tints as well as by the forms of the letters. An expert distinguishes the French and Florentine schools with ease, and the exquisite Arbuthnot Missal is accompanied by a Psalter which is unquestionably British, so crude are the colours, so rough the drawing by contrast with the Missal.



The characters employed in writing varied, as this table shows: it is modified from one published by Sir E. M. Thompson, Director of the British Museum. Some of these held their ground or disappeared as taste altered: some were maintained by express legal

enactment: legal enactment brought others to an end. The most important of these styles was the Irish. In the VI. sæc. the energy of the monks in that island, aided by their fortunate, their protective isolation, gave a peculiar character to their work: it was careful, and breathed a spirit which it is now the fashion to call Celtic. Its lineal descendant was the Anglo-Saxon (that is the customary word), which held its ground till the XI. sæc., and had influence on the style of France as the Carlovingian script shows. It was from the extreme west of Europe that the influence came which ended the Lombardic, the Visigothic, the Merovingian types—the styles respectively of Italy, Spain, and France. These three are variants of the Roman cursive minuscule, whose rounded form assumed a more angular character, more like the later Gothic hand. Merovingian is the official Frankish hand, and in its book form much resembles the Lombardic, for in literary writing there was no tradition except among the lawyers, who, as paymasters, had the right and the power to fix the style. The Caroline hand, promoted by the Great Emperor Charles, is derived from the half-uncial, and is the ancestor of the more modern styles of Europe, as its ancestor was undoubtedly the Irish monastic hand. Alcuin, Charlemagne's instructor, adviser, and coadjutor, who had been Egbert's librarian at York, had all that Irish art could give him. He lived at a time when the *egregius doctor* Aldhelm was not merely skilled in books, but also in art and music—when refinement was not yet effeminate in popular estimation. That it was art which Ireland could boast is clear from the Book of Kells, and the ornament there is striking and beautiful. One sees how close was the art of the scribe to that of the illuminator, for the

former draws the long strokes of his letters so far out as to reach the margins above and below, and if possessed of graceful fancy, gives them a flourish, sometimes completes them by a quaint drawing, so as to render them interesting. Here we may sometimes see caricatures, obviously not planned, just the happy adaptation of chance lines to the whim thereby suggested, the spontaneous origin of grotesques, which some writers have tried to work out as an "evolution," forgetting the difference between a growth and a deliberate design. They speak of the taste for ornament being transferred to the Continent, as if that could have happened. The *taste* was there, the *style* was not: hence the luxuriance with which the primitive simplicity of clerical ornament, of pen flourish, developed. From this simple outfit (the modern caligrapher calls them "gestures") came the elegant devices which graced one or two sides of the text, and at last framed it in a rich setting of varied colour and form. Guillaume Tardif's *Treatise on the Chace* shows how full of incident these decorations may be: a page is set in a rich parterre, another has clever sketches of dogs, hawks, insects scattered on the margins. The artists then united form and colour, not having acquired the cunning of our contemporaries who speak lightly of the one or the other according as they are feeble therein.

The illuminator survived the introduction of printing: indeed, for a time his work was increased, but its direction was slowly altered, till now the illustrator does not always illustrate the text, does not always fulfil the primary duty of ornamenting it.

It is curious how surprised people are to hear that the first types were copies of the then current writing: as that

was the ecclesiastical hand, that transmitted for seven centuries by the Benedictines, the change was quietly accomplished, no one noted it as a deprivation that the old manner was gone. If time permitted, the history of type-patterns from 1423 to the time of the Foulis would be interesting; but I am now more concerned with the essential characters of the process of making a book than with this fascinating detail.

Paper was the customary, but not the exclusive material employed. Efficiency and economy were consulted as before by the continuance of the same machinery for the giving out of the exact quantities needed. The sheet varied in size: here begins the difficulty of describing a book. If a sheet was not folded and was printed on only one side, it would be a broadside. Fold a sheet in two, it is a folio. The folio folded again gives the quarto, and so on till the 32mo. But this describes the *form of the paper*, not the *size of the book*: the folio may be large or small; on the other hand, one may have an octavo the size of a duodecimo. The only safety lies in giving the measurement of the paper, not the number of the boards. But if the binder has had his will of the volume, it may be well to state that also, for then the size of the paper will give the measure of the binder's crime: to be safe, the measurements should be in inches. That does not always help, for there are books and MSS. in the Hunterian Library which are in a pitiful state, even the text invaded by the plow, for the insane fancy of securing symmetry: the doers are dead, the breed is not.

Folio and other such terms, then, tell only of the "form" of the book. The manufactured article has an easy way of recording its arrangements. The water-

marks—patterns impressed from the drying-frame on the paper while it is still pulp, tell how the sheet has been folded, especially when taken in conjunction with the directions of the intersecting lines of the wire frame. The watermark dates from the XII. sæc, and is invaluable both for studying the book and for the detection of fraud. I show a sheet on which the watermark occupies the space darkened—never mind what the mark is—and I have ruled the other marks, the lines called *vergers* in France. Now by folding this repeatedly I get a 16mo, and I follow the mark and lines. We recognise the 4to, 8vo, and 16mo folding. But the Rev. P. H. Aitken made further use of this: he ticked off the gathering (the leaves gathered up to make a section of the book), marking the leaves with and those without the paper mark. That had been done before; but he examined the "fifteeners" in the Museum, and was able to say what books were in the state in which they left the printer's hands, and what had lost their full complement of leaves. Open a book recently printed, you turn several leaves before you come to the text. There is *a*, the front board covered with blank paper: this is now continued into a blank leaf: these are the wastes; *b*, a bastard title on a leaf otherwise blank; *c*, then a leaf (say) of preface; *d*, then two leaves of contents; *e*, then a page of illustrations, the *recto* (the page facing) is blank: *f*, three leaves of notes on illustrations; *g*, then a plate. But this is an 8vo volume, yet I have only 7 leaves. On going back, I discover that the first blank has been cut away, the leaf after the waste—some brute has thought it unnecessary and taken it to write on, or the former owner has tried to conceal his sale of it and taken out the record of his name, or he has taken it out

to "fake" some other book, though its unlikeness to the rest leads to the detection of this fraud. Stay, the book has been bound, and the binder has lost the blank: this is an accident, for a binder would not mutilate a book except with the plow. You may see that the wastes do not belong to that book by their unlike texture, or if you take the trouble to look through them you miss or find another watermark. You have at last got to the book proper, page 1 or sig. B. Of that we have 192 pages or 96 leaves, *plus* an appendix and index (we assume our volume to be of respectable construction); these extend to 8 leaves more: then come the wastes as before and the backboard. Excluding the wastes (binder's wastes) and the plates there are 8 leaves + 96 + 8 leaves, or in all 112 leaves, of which 16 are modern additions: for at first a book began more abruptly, and ended when it was done. How many people when they buy a book care or know how to make sure that they have got all they are entitled to, all that belongs to the book as designed by the publisher? You say this is trifling: granted, but you do not call it trifling to demand that the etching you purchase shall have the full margin, even though there is neither print nor printing upon it? Your work of art is incomplete without the margins, your book without the preliminary matter: alas, it, too, may lack the margins, but that is another story. If you care to ascertain that the printer has not traded on your carelessness, you ought next to collate the volume.

Now, as sheet after sheet is worked off at press, the pile needs arrangement, the sheets have to be lifted and superposed in correct order. Then they have to be folded. Error is prevented in this complicated

task by the use of signatures, letters, or figures at the foot of the first page of each sheet, the former being used by Kœlhof at Cologne in 1472, the latter by a printer at Leipzig in 1489. There had to be a complete set of the marks, and under each mark a complete set of leaves 2, 4, 6, or 8. These were recorded in a "register," so that the binder might make sure that he had got a full volume; but as these registers were mainly for the binder, they were not always compressed into a few lines on the last page, but might be set out at length on a separate leaf. The bookseller of old might rely on the accuracy of his workmen, so near was he to them, so personal was the interest then taken mutually: now we have to, and always ought to, verify the accuracy of the purchase: the risks are now vastly greater, apart from the changed equation of the workman—and this collation ought to be made before the book is cut up. By the way, people fancy that the note "uncut" in a catalogue after an old book means that the folded leaves have not been cut, whereas it refers to the fact that the edges of the volume have not been cut or trimmed, as is done to remove the deckle or rough edge of hand-made paper. Besides signatures, there were catchwords, now preserved only by lawyers, who repeat at the foot of a leaf the word which will be found at the top of the succeeding page. The lawyers retain even the primitive custom of putting a catchword at the foot of each leaf: the early scribes were obliged to do this when several single leaves of parchment were used, but they gave it up when the unit of the volume was of several leaves, say four, when it was only necessary to have a catchword on the last leaf of the gathering.

A book without a title-page is not a familiar idea to us: yet that essential was not a primitive possession of a volume, MS. or printed. In 1476 at Venice it was first used: prior to that, the subject of the work was stated in the colophon, a concluding clause, and the early printed books kept to the old usage. Later the colophon was transferred to the beginning, as in the *Terentianus Maurus* of 1497 (Milan). There a short-lined pseudo-title occupies the middle of a blank leaf. But the colophon did not at once shift: to the author's name were added the place and year of printing, and the printer's trade device. As in the colophon, there might be a great deal of superfluous matter on the title-page. Thus a Glasgow pamphlet of last century, of some 100 pages, has a title-page of forty lines—a superfluous preface in fact.

More interesting is the bookplate, There is no proof of the oft-repeated statement that paper had been made for a French royal personage: his initials happened to be the maker's watermark, that is all the ground for the story. But it is certain that MSS. were adorned with the portrait and arms of the patron: sometimes there is a presentation scene, just such a scene as is frequently recorded in Italian paintings. Or the arms only are given: the Sarum Missal has the royal arms on a page, the reverse of an early sheet, the whole page. Such a page transferred to the front board seems the hint for the "Ex Libris" which are the object of a special society, and of a special journal. Some of the older bookplates were works of art: thus, Audran, a French engraver, has attached his name to what he did not consider beneath his dignity. A weekly journal lately pilloried the snobs who take armorial bearings to which they have no title:

worse are those who do such misdeeds protected by privacy from detection. Not every Hunter, not every Campbell has the right to the arms or crest which the head of the family uses by prescription of descent: "A' Stewarts are no sib to the King" is the Scottish proverbial reproof of such heraldic petty larceny. It is of no consequence now whether a man is entitled to wear "luces on his coat" or any other device, no social mistake follows. But just on that account it is painful to find a book disfigured by such counterfeit gentility. The innocent book should not be made an accomplice in a fraud: the book's side of the matter is the stronger, if a recent writer is correct in saying that there is nothing wrong beyond the vulgarity. Dr. W. Hunter had no bookplate, though frequent enquiries are made as to this supposed libel on a sensible man. The University had a bookplate prepared for the Hunterian Library, and though fastidious persons find fault with it, to me it is a good engraving, endeared by the memory of the hall it represents, a hall no longer existent, but in which my early years in Glasgow were spent as its Keeper.

I do not propose to enter on the subject of Greek MSS. The Museum has only one of any antiquity—it is dated A.D. 859.

Of Roman MSS. the earliest are the inscribed stones found along the line of the Antonine Wall, and recently published by Annan, as *Tituli Romani*, the text by Dr. James Macdonald, the beautiful photogravures by the Annans, from photographs by the late T. Annan. The capitals—they are all capitals—are upright, and some of them have the grace of Pisanello's lettering on his medals. Persons of artistic pretentions (pretence would

be more correct) say they do not admire these. Look at a Baskerville title page of last century, or a Cambridge one of a date so early as 1521. I do not offer a foil to these, you may look around and find plenty even in the books issued by firms of good repute. For the title page is the porch of a temple or chapel in which you look to find something to admire or to learn: you may not find much, but even if there is a little, it is right to do for a book what the owner of a booth at a fair is wise enough to do for his show—make entrance attractive. A title page should be a work of art, or at least treated on the same principles—balanced, proportioned, graceful. You do not find overmuch of this spirit nowadays, but I will not incur the charge of libel aggravated by truthfulness.

Upright capitals became rustic by getting sloped, and the lower lines and top prolonged with more or less curve, a rudimentary flourish: they were used by the stone cutter, and after him by the scribe. The scribe used black, rarely red, ink: later came the use of gold. But with this extravagance, not unseemly as practised by Arab and Persian writers, went the staining of the vellum. The ornaments became more complex: in the III. sæc. Homer, written with gold on purple vellum, was given to the Emperor Maximian by his mother. From the East or from Egypt this luxury came to Greece. Jerome says, "Those who wish may have old books written on purple skins with gold or silver in uncial letters, works rather *exarata* than *codices*, while I and my friends can have poor *scedulas* and *codices* not so pretty as correct (*emendatos*)." There is superciliousness and envy in this remark: a poor book may be pretty—poverty is not bound to be untidy or in bad taste.

The ornamentation of later times, later than the Virgil and Varro portraits, later than purple vellum smoothed with pumice stone (Martial), was in the hands of specialists, of rubricators who inserted headings, of illuminators who added the floral decorations and miniatures. These were either done on the spot, or skilled artists were brought from a distance, or the volumes were sent to them to be finished. This seems a great outlay, but it is to be remembered that the paradox holds for these men, as for others of the time, that the poor were most given to travelling when the facilities for travel were least: Scottish scholars were to be found in every university of Europe. Freemasonry may have contributed, but the benevolence of monasteries was more useful and freely rendered to the itinerant, even if now and then strollers were surreptitiously admitted, or unconsciously welcomed, who might amuse with jest or song the poor fragment of humanity not yet killed out of young bosoms, or if the door were harshly shut in the face of zingari or troubadours of small repute, who, it is to be feared, justly alarmed the abbot. Of this a slight hint is to be found in Scott's *Talisman*.

Script was a mystery, a phrase which covered the guild spirit, sanctioned the determination not to admit more apprentices than might be consistent with the safety of the privileges of the guild brethren. We look on script as individual: in the old days it was racial or professional, primarily racial. Maunde Thompson's table is at once an enumeration of styles and a statement of their pedigree. All converge towards our own time, yet racial unlikenesses still survive. Cursive is the product of smooth surfaces and the need for greater speed. What is known as Court hand—not courtiers, but jurists or

officers of chancelleries—may be regarded as the chief professional hand, as one designedly kept peculiar: it was a shibboleth of an exclusive and jealous calling. I do not mean this in an obnoxious way; there was good reason to guard the methods of a profession on whose accuracy large interest depended, and if small men misused this wise precaution of the superior members of the clerical profession, that was a natural consequence of the necessary admission, as time went on, of men who, useful in the lower walks, traded on their position: our own times have witnessed the lowering of dignified professions by the democratic opening of them to all and sundry.

The Book hand, the model for types in the XV. sæc., is the most important. I have already said how Irish taste and skill dominated in the IX. sæc. The scene of its birth, the arena of its triumphs, was in the monasteries, which were long the centres of learning—Benedictine, chief among monasteries, as if they had by anticipation atoned to humanity for the conduct which earned for them suspicion and dislike. In the XIII. sæc. the universities stepped in and superseded the monasteries: but it may surprise ardent academicians to find that the diffusion of learning from the universities was not by books—that, indeed, pains were taken to prevent such diffusion. Officers were appointed, whose business it was to recover from students all books, text-books, borrowed by them during residence, and so the university store was maintained for the benefit of succeeding generations of students. A little reflection explains this seeming perversity: at stationers' prices of to-day you could not get a Bible in MS. under £72. Monasteries might get books done cheaper by their inmates, though this is doubtful: but whence was the money to come

for the necessary annual supplies of the same books, if students carried away the volumes after using them.

Gradually literature became more popular, and, even before the advent of printing, *cartolarii* or papermakers were the employers of scribes, an arrangement of which the law-stationer is the survival. But university patronage had its advantages: the academic privilege of exemption from taxation was shared by those who as book-traders held licences from the universities, and these were in Paris in XV. sæc. united as a guild of book merchants. The share of book markets in spreading knowledge is not easily realised now, when Leipzig and Novgorod are of the few towns in which this institution survives.

The history of the book-trade is a separate study, introducing us to many curious details of medieval life and manners. The student who cares to gather together the fragments may learn how the universities helped and retarded enterprise.

The scribe and the illuminator have been mentioned; a third has to be reckoned, the designer, who sketched the work for the illuminator and who has left tentative fragments on the blanks of some MSS.: in a copy of Bartholomeus the outlines only are given throughout the volume, the drawing firm, bold, always adapted to the space allowed. Here, too, styles may be recognised: French and Italian (Florentine for the most part) are well marked. The Arbuthnot Missal and Psalter contrast, the former being the work of a foreign artist, the latter British, one fancies Scottish.

The art of the illuminator has been dealt with in several treatises, in which may be learnt the details of the process, and the receipts for colours, etc.

The printed volume was at first a close copy of the written in form and character. The question, who invented movable types? does not seem an important one: yet it has an interest. Haarlem claims the honour for Koster (it has usually been given to Gutenberg), and, even if types were used by him, his discovery was a barren one, could not have been anything else. Printing would have gone a short way without metal types and an improved press; these were Gutenberg's contribution. Putnam takes a middle course: for, as he says, though others reached America, it was Columbus who gave that continent to Europe: Koster may have had priority, but Gutenberg gave the art permanence.

Block books there are in the Museum, xylographic, the whole page cut on one wood block. Blocks were early used in the manufacture of Etruscan pottery, and the Chinese still use them. It is not certain that Marco Polo brought the idea from China to Europe: he might have done so. If it could be proved that he did, it would be a substantial offset to the nonsense he did bring, interesting though it is. Whencesoever it came, block-printing began modestly enough in Europe. Single sheets bore on one side the figure of a saint, as St. Christopher, dated 1463. Of such broadsides the chances of survival were poor: of the few extant, one has been tampered with—it bears 1418, but is probably of 1468. Cards were an important article of Venetian manufacture, important enough for the printers to have their privileges protected by legislation. Block books were volumes of wood engravings with relative text, designed for the use of the clergy in the first instance, and helpful to all whose burden of learning was scanty, for the pictures were mnemonics which recalled the

story, even the words. The dated examples are late in the XV. sæc. Usually printed on one side, some were printed on both sides, and so link the group to the printed volume.

Koster's claim to priority rests on a document in the archives of Lille: it speaks of books *getté en molle*, a phrase explained in a Paris deed of naturalisation on behalf of printers who used *escritoire en molle—i.e.*, moulded letters. Some block books contained printed matter, for which an ink made up with grease seems to have been used: but after Koster's death, 1439 or 1440, typework ended in Holland: it was not, therefore, a permanently established invention as was Gutenberg's. The Hunterian copies lack all indication of place or date: they are not even complete, being made up from several copies, as is seen from the study of the worm holes, these enemies of books being in this instance of service. They are hand-coloured with a water-tint.

The earliest printing from movable types was for the Indulgences, those broadsides which made so deep an impression on the minds of the Reformers. These began in 1454: they were the work of two printers, are in 30 and 31 lines respectively.

Here begins the modern art.

The types were, as said, modelled on the script of the time, and Gothic or black letter was, as might be expected, the style of Germany, where it was first used. Even in Venice Aldus cut his Greek types after the script of his friend Musurus, thus securing continuity of style: previously, as in the *Lactantius*, the Greek quotations were inserted with the pen. The Aldine italic was similarly founded on the writing of Petrarch.

There was thus nationality in types, the German style being the most characteristic. So much depended on the style of the type that the first printers were their own type makers. Later, the two businesses were separated, the first type-founder, pure and simple, being Benvenuto Cellini, a Roman Goldsmith, another of the crafts which aided artistic progress. The skill of the type founder depended on the excellence of the punches and their durability, for he had to renew the types when the edges became worn. Sharpness of outline distinguishes cast from moulded types, the latter having the asperities of edge common to all things from a sand mould. Punches were thus a valuable property, an important asset in the estate of deceased printers. Naturally, therefore, the study of type forms an important part of the bibliographer's duty. Printers are recognised by the aspect of their types, and when they used more founts than one, these may be arranged chronologically, as Blades has done for the Caxton Press. Much skill may be shown in the identification of printers who have used types once employed by an earlier press. The narratives are not always forthcoming, but certain recorded cases let us see the extent to which such transfers took place. Bechtermunze is found in possession of the types used by Gutenberg for the Catholicon. One of the Bibles shows the need for care. It is known as the "R" Bible, from the peculiarity of that letter which Bradshaw recognised in a Bull of Sixtus IV., 1478, and which occurs in some copies of Vincent de Beauvais' *Speculum Mundi*, proving that such copies are made up of sheets worked off by Mentelin and by the R printer, a contemporary, perhaps a townsman, of Mentelin at Strasburg.

The history of the art is bound up with that of the practitioners. The troubles of Gutenberg were due to his character: he was an inventor, indomitable in perseverance, careless enough of his skill, profiting little by experience in his dealings with men. He appeared in several lawsuits, the first being a case of breach of promise, probably settled by marriage. The others rose out of the loans obtained for the perfecting of his process, of his inventions, for there were two—the press as well as the movable metal types, to which we owe the speedy production, cheapness, and beauty of books.

The steps followed each other with marvellous rapidity. Block books dated from 1422: movable wooden types from 1438: metal types were cut in 1450, and cast in 1458. In less than 40 years the art was complete, and in 540 years little has been added save in details. Printing was like Athena, born mature from the brain of Zeus: the products of the early press are not surpassed by books of our own day. Time has modified details, has improved processes, but has not given us works of greater beauty than those issued before 1500.

Gutenberg had borrowed money from Fust, and began his Bible in Latin in 1450: but success was fatal to him. He had to repay the loan with interest, and, in default, forfeited his plant to his creditor. The first dated production of typography, a wall calendar of 1457, was found in the archives of Mainz wrapping up some papers. Fust assumed a partner, Peter Schoiffher or Gernsheim, and the new firm issued in 1457 the Psalms, duly dated, and with the printers' names—the first of these authentications. The types were Gutenberg's, but the initial letters were wood blocks.

The fall of Mainz, 1462, when it was taken by the Count of Nassau, scattered the "Chapel" and secured the diffusion of printing over Europe.

Venice, the emporium of trade, was the next great seat for the art, though Subiaco had priority as the first place where Germans established a press in 1464. Italy took it up with the zeal to be expected in the land of the Renascence, and in 18 years had 80 presses in different cities, as against 9 German cities, which in 40 years were known as printing places. Printers were attracted to Venice, among other inducements being the cheapness of paper, the trade in which was then centred in that port. Splendidly did Venice treat the infant art—too generously, for, seeing its importance, the Council gave to the press incautiously unfettered patronage, and had to devise a scheme of censorship, for liberty degenerated into licence. When Rome, scenting heresy, established the Index, Venice did its best as a mediator and, though it could not check, did much to moderate the first severity of the Papal scrutiny.

The earliest Hunterian book of the Venetian press is *Pliny*, 1469, by John de Spira; but this is the third book issued, its predecessors being Cicero's *Epistolæ Familiares* and Augustine's treatise *De Civitate Dei*, the second volume of which was printed after the death of John by his brother Vindelin. The *Cicero* was reprinted in 1470: that was a new edition so far as it was re-set, the first issue having turned out to be too small for the demand. This was not the only instance of the same sort: differences occur between copies of the same date, only explicable by the distribution and re-setting of the type. It is a less curious performance than that whereby the 42 line Bible assumed its final form: the

first gathering being in 40 lines, when the type was re-cast, and with smaller font a 42-line page was possible. There are instances where (I suspect, but have not yet had time to work it out) the printing seems to have been suspended, perhaps for some more urgent work, and the form differed when re-set from its original shape.

Jenson, a Parisian goldsmith, reached Venice after a curious career. While master of the mint at Tours, he was sent by Charles VII. in 1458 to learn the secret of the Mainz invention, returning in 1461, when he again left, for Louis XI. was now on the throne. In 1470 he began to print, and had issued 155 works before 1480. He had a partner, John of Cologne, who, as his name is always first, was perhaps the moneyed partner: he carried on the business after Jenson's death; but then, 1481 had a new type founder, John of Selgenstat.

Roman letters were used; but a return to Gothic suddenly interrupts the sequence. This was a necessity arising out of the demand for cheap books; the Gothic takes far less space than Roman characters. Venice was not the first place where Roman type was used: in 1464 the *Rationale Divinorum Officiorum* of Duranti was printed at Strasburg in this character, and Schoiffher's Psalter has a fine form of this character in MS. Windelin de Spira forsook it in his edition of Robert de Lilio's *Quadragesimale.*

As at Mainz Schoiffher had two styles—one for ecclesiastical, the other for secular works—so Jenson kept his Roman character for classics, Gothic for theology and canon law: the distinction of civil and canon law is not now recognised, save in the honorary degree of some universities, LL.D. translated *Juris utriusque doctor*, the

English degree of D.C.L., admitting the distinction by confining the designation to civil law.

Classics did not at first include Greek. Fust and Schoiffher, in place of inserting quotations with the pen in spaces left for the purpose, used very rude Greek letters in their 1463 *Cicero*. Jenson's *Cicero*, 1471, Sweinheim and Pannertz' *Lactantius*, 1465, contained Greek types of no very definite character. At Milan Dionysius Paravisinus led the way, printing the first Greek book, Lascaris' Greek Grammar.

Aldus introduced the Greek text. Cardinal Bessarion had gifted his great collection of Greek MSS. to the State: Greeks were numerous in Venice. Aldus was thus attracted to the place and the work, and, though four Greek texts had been issued in Milan, Vicenza, Venice, and Florence between 1476 and 1488, he entered on a new enterprise, the cutting of Greek punches, which he modelled on the writing of Musurus, his friend. In 1495 he got a privilege for his Greek font, and was thus secured for 20 years in his well-earned rights. No book in the Library is more lovely than his *Plato* on vellum, the very ink has a lustre as if it were recently printed, and Derome's binding enhances the pleasure with which one handles a noble specimen of typography, one which Dibdin confesses excited his cupidity. Small wonder that Aldus outstripped rivals, whom he (wisely) made his associates in the Neacademia, a club (if one may use a premature phrase) afterwards imitated by the Foulises. But success had its drawbacks: the work came to be hastily done, and MSS. were sacrificed. The editors altered the script, and their emendations, not the originals, were copied by the printers. One cannot have everything, but it is to be regretted that we have no

opportunity of checking the changes, or of justifying judgments concerning which we can have no opinion now: had Cassiodorus seen what happened, he might have revised his too liberal encouragement of promiscuous emendation. Nor was this perhaps the only way in which MSS. disappeared *in ædibus Aldi*; the parchment of the *Plato* is very white, it may have been slink calf—it is thin enough, but thinness results also from the polishing with pumice of which Martial speaks. It hurts one's conscience to hint even at such a thing, for there is no one now to resent the libel: yet if it were all true, much may be forgiven to Aldus, for he loved much.

If Roman character was not a Venetian invention, italics are due to Aldus, who has given us a cursive hand of chancery paternity, far superior to that of Paganino, his only predecessor in this line of novelty. It seems a trifle, but it was a revolution: it greatly diminished the area of print, reduced the cost to an eighth. For Aldus folded his paper to a smaller size, on which his italics showed to better advantage than on a folio or even on a quarto sheet. His 8vos became at once popular, being easily held in the hand, easily carried in the pocket.

Roman, Gothic, Italic, so descended the size at this time: so, also and alas, descended the dignity of books; but there were compensations. Italics ended the big evil of big books. Vincent de Beauvais' *Speculum Mundi* measures 18×10; the text 12×9: it weighs 16 lbs. No one, not even that diffuse word-spinner, would have faced a small 8vo.

The old gatherings were still continued in all essentials: the paper was set out as before. As the size of

the sheets varied, a quarternion was now a measure of folding, not an indication of size. To ensure accurate gathering of the printed sheets, three expedients were available—signatures, catchwords, numeration of *folia* or of pages.

The signatures have already been described: it should have been said that the scribes put them so that they might be, at least were, cut away when the volume was trimmed for binding. First used in 1472, their utility did not at once commend them to all: perhaps they were deemed innovations and resented accordingly. John of Cologne used them in his *Varro*, 1474; Jenson not till 1476.

The scribe placed numbers on the leaves in each signature, at least on half of them: the pages were not numbered till printing had made some progress: probably this was a demand of scholars, for ease of reference.

Catchwords, the survival of which I have mentioned in legal documents, were at the end of the gathering in MSS. Windelin de Spira used them in 1470 in his *Tacitus*: Jenson never employed them. Collation, a table of gatherings giving the number of leaves in each signature as a guide to the binder, was first used by Jenson in his *Plutarch*, 1478: though this was possibly not an early example. It is perhaps only an early preservation, for the leaf containing the collation would be for the most part thrown away when its work was done, the volume made up.

The scribe in adding a colophon did more than thank heaven for the end of a weary task: he gave the customary designation of the work, the name of the scribe, of the person who patronised the book, and often the fee paid for transcription: it might be, often was, an inter-

esting chapter of literary history. The adoption by the printers of the colophon, and its removal to the beginning of the book was a step in the creation of the title page. It is strange that so many books were issued without the signature of the printer, that so many volumes can only be referred to their presses and years by the exercise of much critical skill. The title page, however, was a permanent addition when it was started. It offered excellent opportunity of advertisement, laudatory verses were appended: now, the publisher has to borrow cuttings from newspaper notices. To the initial baldness of a title page may be added various sorts of information. The censorship used to be appeased by the statement of privilege granted. Cambridge desired to borrow the Greek fonts in the possession of the University of Paris, which was ready to lend them on condition that the source of the loan was stated on the title page: the negotiations were broken off. Tradition had it that no respectable printing firm neglected to put its name to what came from its press, unless during a contested election. Pity it is that the tradition has ceased to operate, still greater is the loss of the quaint device, punning or symbolic, by which the printer marked his property. It has disappeared because the printer is no longer the most important person in the production of a book: the publisher or the capitalist takes the front place nowadays.

For the work has been divided: typefounder, paper-maker, printer, bookbinder, all are apart: publisher, bookseller, even the salvage man or second-hand dealer (he calls himself in Germany 'antiquarian') are each independent. Illumination is divided among lithographers, chromo lithographers, process block makers, the

vanishing woodcutter, the extinct line engraver. It is a hard matter to get an artist designer employed, so keen is the competition, so narrow the margin of profit. Bishops are no longer press readers, no Erasmus is the ally of the printer: what proof-reader could now edit a classic? Caxton was a wholesale monopolist—he wrote, printed, bound books which he had edited, translated, composed: he was his own press reader, and he had reputation as a business man.

I have now sketched the grounds on which I claim respect for a book, not for its contents merely, but, whether these be good or bad, because a book is a work of art, a product of centuries of thought, skill, care. I have freely borrowed from many writers, so as to show that every page suggests interesting reminiscences, matters for admiration, sometimes also for regret. These latter are chiefly modern improvements, as they are called. We at once think of the bookbinder, who now possesses a new and awful weapon in the plow; it is too easy, too sweeping, it tempts an innocent man to try its powers, and when he has used it, unless he thinks of the results, he is apt to think it a good tool. But there are other better reasons for remembering of the binder: Pynson's work is costly, so few examples of his bindings survive: we are tempted to suspect that they must often have been needlessly sacrificed. Let us, however, be just. Bindings cannot last for ever, libraries are not always safe, custodiers not invariably trustworthy. Water has ruined many a volume destined otherwise for a long life. One might weep over many a volume in a library like the Hunterian. Men's carelessness, political and social, not to say religious upheavals, each tell their own tale, leave their own record. The Protestant who rubbed out

the names of Popes, the parvenu who defaces the arms and name (sometimes he leaves the arms) of a former noble proprietor, a degenerate who sells his library and tries to obliterate his shame with his crest, an ignorant upstart who sprawls his name over the title page of an *editio princeps*, and is so besotted as to think the value thereby enhanced even when he scribbles it on other leaves, these enemies of books are not sufficiently hated of men. A collector found a lot of precious volumes reduced to pulp in the library of a public school, and reverently and with patient care sought to restore them to legibility. An idiot found a volume damp, and put it before a fire as if it were a pair of trousers: the vellum is now all crumpled, and the idiot does not know how it happened. There is a villain worse than all these because he must have been somehow connected with the trade, I mean the man who invented wire stitching. He is, I hope, dead, and beyond my wishing worse. Have you ever seen a well-bound copy of a good author yield up its soul when the book was opened? the whole print drop out between the boards, leaving rust on the back, and iron stains on all the leaves? You cannot be sure that every house near the sea is free from damp, you may at least have the sense to light a frequent fire in the bookroom.

But for triumphant brutality, give me the man who "fancies himself" because he has bought a few books. See him wet his finger to turn the leaves of a costly volume, just as a street greengrocer or milkman turns over his passbooks. Or he shoves the leaf over by the lower edge: or if he is a scholar—even they are not always well trained—he reads with dirty finger tracing his progress, more rarely he does this with a pen just dipped

always well trained—he reads with dirty finger tracing his progress, more rarely he does this with a pen just dipped

in ink. Yet these are nothing in comparison with the brainless and conceited fool who writes on a book, notes his opinions regarding the author, the style, and all the other matters with which he is incompetent to deal intelligently. No curse is strong enough for the selfishness which forgets that others may follow who do not care for foolish sayings foolishly written. Bad as is the offence, it is less painful than the coarse selfishness of character which allows a man thus to maltreat a book.

THE SCIENTIFIC PREMONITIONS OF THE ANCIENTS

[Date 1901]

It has been said that there is nothing new under the sun, and geologists have laboured to prove that, at least in the inorganic world, the melancholy conclusion holds good, the thing which has been shall be again. But while these researches are received with favour, opinion wavers concerning those who seek to prove a parallel, that what is thought has been thought already. The progress of any important discovery has been said to be marked in three stages, it is not new, it is not true, every one knew it: so it slides into common belief, and the date of the discovery is remembered only by the learned. There are in literary and scientific history many curious examples on which is based this cynical encouragement of original thinkers. At present I would confine my remarks to one of the methods by which the first stage in the suppression of merit is attempted or accomplished.

When the originality of Darwin's theory of the origin of species is contested on the ground of its similarity to the views put forth by Lamarck, the critic proceeds to verify or disprove the assertion with care, conscious of the possibility of coincidence between two observers so near to each other in

point of time, therefore so nearly equal in respect of the knowledge on which their speculations might be based. When, having made the inquiry, he finds that the two theories differ most importantly—that while Lamarck assigns to external conditions for their result the production of new organs, by inciting to new actions and habits, whereby the animal accommodates itself to an altered mode of life—Darwin sees in such altered conditions circumstances unfavourable to the ordinary individuals of a species, but favourable to some few individuals possessed of some variations of form or habit which enable them to get on better among the altered surroundings, circumstances whose continuance permits the increase of the specially favoured variety, while the less favoured congeners perish :—while the one makes the individual personally active in the morphological change, the other sees the chance-produced variation perpetuated by, for, its suitableness to the new order of things :—while Lamarck finds in the present aspect of fauna and flora the sum of progressive modification, the lower terms of the series being maintained by a process of creation hardly to be distinguished from spontaneous generation, Darwin is on his guard against the assumption of progression, because the data are manifestly imperfect, and, by the terms of his hypothesis, he has no need for the introduction of any such arbitrary new creations :—when it is found that the two theories differ so profoundly it is competent to call in question the honesty or the capacity of him who finds in the latter the repetition of the former hypothesis. At best he has mistaken formal similarity for essential identity, misled perhaps by the one common term in both, the influence of varying external conditions.

But the short interval of time which separates the two authors does not of necessity involve that equality of knowledge which increases the chance of coincidence or of complete anticipation. The ignorance of contemporaries in certain kinds of knowledge may place them, relatively to us, as far back, in respect of these knowledges, as the revival of letters. The accomplished scholar of recent date may have had less acquaintance with natural science than had Aristotle, while a lively fancy may have helped him to utterances which at first sight resemble the discoveries of a later day. Restiff de la Bretonne, a French author whose works are little known in this country, believed in a single progenitor in the animal and vegetable kingdoms respectively, whose descendants have differed under the influence of sun and climate. This is all: yet this, dignified as a "system," has been put forward as another anticipation of Darwin by M. Fée, who nevertheless most justly describes the opinion as "hatched in a head purely literary" by one who "only wanted a little more reason to become a man of great eminence." To claim scientific priority for such an assertion and such a writer involves the double offence of depreciating an original thinker by means of one whose vague words only acquire meaning from the discoveries of him whose rival he has been made.

The instances are rare in which, unless passionate prejudice has for a time obscured reason, the insufficient knowledge of a comparatively modern writer is made the instrument of criticism so unfair. But it is not infrequent that writers of weight, under the influence perhaps of some lingering shade of medieval scholasticism, seek in classical literature the forewarnings of modern science —seek, and for the diligent searcher this is to find, in

some Greek or Latin author the knowledge hardly won by modern toil, yet lying there, we are asked to believe, lavishly scattered amid the dust of ancient philosophy. Let me not be understood as in my turn seeking to depreciate the wonderful sagacity which underlies many of the speculations, the clear foresight which under unfavourable conditions, in the total lack of instruments of exact research, enabled these authors to leave enduring monuments in science, whose ornaments we may indeed fashion differently, but the framework remains intact. What is really good needs not my commendation: what I desire to protest against is the ascription to them of knowledge they could not by any possibility have attained to—knowledge which, when critically investigated, is too often found wanting, leaving upon the early philosophy unmerited suspicion which should rather be the meed of its injudicious, often unscrupulous, admirers and partisans.

If science be that "co-ordination of facts which describes the order of co-existence and succession in phenomena" (G. H. Lewes), it is evident that, proportionally as we recede into those times when the number of observed facts was least, the materials of science diminish, the observed succession of phenomena becomes more imperfect, the co-ordination of facts is *pro tanto* less worthy of acceptance. This holds true for all facts, especially for those whose just appreciation depends on the fulness of collateral knowledge, above all for those whose observation is not possible save by the aids which collateral knowledge can alone supply.

Much knowledge of the structure of the lower animals was undoubtedly in the possession of the Greeks of the fourth century B.C.: but what might be called compara-

tive zoology was not even possible till a much later date. For not merely were the materials wanting which only the examination of a wide range of animals from all regions could supply, but, even if they had been accessible, they could not have been profitably investigated till optics and chemistry had attained such development as to provide means and methods of research beyond the reach of the unaided senses. Nay more, could we conceive these aids to have been accessible to the ancients, it is impossible that sound anatomy or physiology could have been arrived at by their help, so long as men's chief reliance was placed, for speculative purposes, not on the qualities of things in themselves, but on the verbal designation of those qualities, or on notions derived secondarily from these designations. Thus continuity of motion, continuous motion, was held proven, because continuity was a better idea than successiveness, if the word is allowed.

It is not at present my intention to discuss the limits of the knowledge of the ancients, even in the restricted field of zoology: I must ask attention to a criticism which appeared in a semi-literary journal, on whose staff was more than one sound scholar:

"The curious in literary pedigrees have been tracing the parentage of Lord Palmerston's popular phrase, 'the fortuitous concourse of atoms' with praiseworthy diligence. Those who were not aware that the words have been long in common use with students of old and modern philosophies began by crediting the late premier with their origination. Then somebody said that he must have learned them from Dugald Stewart. Then South had the credit given him. Now we learn that Locke uses the phrase; while at the same time other

writers quote from Cicero to show that Locke only repeated what the old Roman had said before him. In fact, however, the idea embodied in the phrase is far older than Cicero, who, like the Roman philosophers in general, went to the Greeks for the materials of his abstract thought. The theory about these atoms whose chance combinations were supposed to have produced the existing organic universe, is to be found discussed in Aristotle's *Physics* (198 b. Bekk., ed. Maj.), and what is just now most remarkable in immediate connection with a theory identical with that which is propounded by Mr. Darwin in his *Origin of Species*. Those atoms were believed to have been perpetually moving about from all eternity, forming a countless variety of organic combinations, out of which combinations only those survived to perpetuate themselves 'in their kind' which came off victorious in the universal conflict for organic existence. As described by Aristotle the philosophers in question asserted that rain is not designed to make corn grow, but that as rain happens to be the means of propagating the existence of grain, therefore grain 'by the force of natural selection' continues to flourish on the earth. If the rain had not happened to be ready to nourish the corn as soon as the fortuitous concourse of atoms had made the first corn, grain would immediately have become extinct: till in the never-ending shuffling of the cards, the same atomic combination would once more turn up. The real theory of Mr. Darwin is, indeed, summed up by Aristotle in the single sentence: *Ὅπου μὲν οὖν ἅπαντα συνέβη ὥσπερ κἂν εἰ ἕνεκά του ἐγίνετο, ταῦτα μὲν ἐσώθη ἀπὸ τοῦ αὐτομάτου συστάντα ἐπιτηδείως· ὅσα δὲ μὴ οὕτως, ἀπώλετο καὶ ἀπόλλυται, καθάπερ Ἐμπεδοκλῆς λέγει τὰ βουγενῆ καὶ ἀνδρόπρωρα.* (When

all things happened to be produced just as it would have been if they had been constructed with a definite design (ἕνεκά του), those combinations were preserved which happened to fall in with the general working of the whole: and those which did not thus fall in perished and still perish, like the minotaurs and sphinxes that Empedocles speaks about.) It is impossible to translate the sentence except periphrastically, but its meaning is abundantly clear: and it shows that the Darwin theory is at least two thousand years old. The only difference is that between the old and the new speculation, while the new school use the word 'law' as indicating the relationships of the ultimate atoms, the ancient speculators attributed everything to a power which they called 'necessity.'" [1]

Aristotle here states the opinion of his predecessors as a text for the teleological argument to follow. The antagonism which Empedocles found in all things, and which chance alone seemed to his mind capable of counteracting, is probably aimed at by Aristotle, while the mention of "Intelligence" also, in the previous sentence, seems to involve Anaxagoras in the censure, widely though his conclusions differed from those of his predecessor and his contemporary. The example cited, that of the growth of corn under the influence of rain, is this: rain is the "necessary" (ἐξ ἀνάγκης) result of the condensation of vapour: its fall the necessary result of that condensation: the growth of corn coincides with the

[1] In the same periodical appeared a notice of the *Origin of the Species* which Darwin was well satisfied with, expressing his contentment with the opinion of G. H. Lewes. The above-quoted passage cannot therefore be ascribed to that writer, though he was a contributor when it appeared.

fall: the two events are in accidental relation—growth is not the design (*οὗ ἕνεκα*) of rain. Again, the destruction of corn by rain is a similar coincidence, equally without design. The fitness of the teeth for their function is a similar coincidence. Then follows the passage quoted above.

To the arguments thus stated on behalf of his predecessors Aristotle replies after this fashion:

"It is impossible that this should be so: for these and all the products of nature are always, or for the most part, so produced: but none of the accidental or spontaneous products are so. For it does not seem by accident or by coincidence that rain is frequent in winter, but (it would be) if it happened in summer: nor are great heats at the dog-days accidental or by coincidence, though they would be so if in winter. If therefore these seem to occur either as coincidences or by design (*i.e.* with an intention) and if such things cannot be held to be mere coincidences or accidents, they must be for a purpose. But all things are so in nature (*i.e.* for a purpose) as even those who hold the above views would admit. There is then a purpose in the production and existence of all natural things."

This reply is a mere quibble. The reasoning is founded on relations which are as purely accidental (in the logical sense, not as meaning fortuitous) as could be chosen. Had he referred to the positions of sun and earth at these seasons he would have improved the argument, but then even the doctrine of chance could not have been much shaken. The tenets he opposes have in truth a strong cast of that which nowadays, as materialism or some other much abused, little understood spectre, guides to a large extent scientific research.

Mr. Mill has very clearly put the modern creed: remarking upon the "revival of the doctrine that efficient or ultimate causes are within the reach of human knowledge," he holds this revival as a remarkable instance of what has been aptly called the "peculiar zest which the spirit of reaction against modern tendencies gives to ancient absurdities."

Before quitting this subject, however, it must be mentioned that the refutation by Aristotle of the Empedoclean tenets seems to have been as inconclusive to himself as it is to modern readers. In his treatise, *De Partibus*, c. 2, he speaks of the gall bladder, and denies its influence upon the feelings on the curious ground that it is absent in some animals and may be so even in man. He therefore regards it as superfluous or "excrementitious" and not for a special purpose: adding, "Nature indeed sometimes uses excrements for useful purposes, but we must not on that account seek a special purpose for all things, but, certain things being such as they are, many other things of necessity happen in consequence." It may be added that if this passage did not rightly present the true practice of Aristotle, whatever were the formulae to which he may have been led, he could not have reached that result to which, as an anticipation of the law of economy or correlation of growth, reference will be afterwards made.

The interpretation of Aristotle's words as a summary of Mr. Darwin's theory results from one or two misapprehensions. In the first place the growth of corn under the influence of rain is said by the writer to be "by the force of natural selection." Darwin's terms are here totally misapplied, and, even if they were correctly used, are not warranted by the text. Secondly, the drift of

the argument is inexactly stated in the paraphrase "only those combinations survived to perpetuate themselves 'in their kind' which came off victorious in the universal struggle for organic existence." No such struggle is hinted at in this or in any other passage: it was not even dreamt of. The struggle, dimly alluded to by Aristotle a few lines previously, was one between the forces of nature, which perplexed Empedocles. The conflict was for *individual* existence not for that *serial* succession whose possibility, under certain conditions, it was Mr. Darwin's purpose to illustrate. The speculations were in fact, like all others of the period, rather directed towards explaining the origin than the persistence of all things. The hold which the doctrine of the Atomists maintained seems due to this limitation of its use, since, if followed out to its logical results, it must have broken down as it did when extended by Anaxagoras imperfectly, and more clearly by Aristotle. Thirdly, "the general working of the whole"—the phrase used in the above translation—vitiates the whole argument. The chaos of moral and physical forces, amid which chance alone seemed capable of producing a fitful order, was at variance with the idea of plan which these words manifestly suggest. That idea it is which Aristotle seeks to substitute for chance. The real meaning is that those were saved which happened to be fit for the conditions to which they were subjected. The limitation of these speculations is evident from a subsequent chapter in which Aristotle investigates necessity and states it to be a preassumed (ἐξ ὑποθέσεως) property probably resident in matter (ἡ ὕλη).

This property therefore expresses the relation of the ultimate atoms: the relation of the aggregate is, for

Empedocles chance, with Aristotle τὸ οὗ ἕνεκα ἐν τῳ λόγῳ. It follows therefore that if this hypothesis is to be compared with the modern theory, law is represented not by necessity, but by τὸ οὗ ἕνεκα, or by chance.

Again comparison of hypotheses implies some common basis either of facts or method. But no such basis exists. The ancient speculation is purely subjective: it is an arbitrary assumption arrived at by no observation and incapable of being tested by its application to facts. It is a vague protest against the ignorance of facts which then hampered physical philosophy, an eager attempt to overleap the slow accumulation of data, and feel the future in the instant. The one hypothesis is barren, lifeless; the power it involves to bring order out of chaos is one by which order is impossible, since its operations at any time have no relation to the past, no influence on the future. The other is rich in results, for the law to which it appeals represents a continuous order of events, each of which is inseparably connected not only with the past and the future, but with all that takes place in the present. It is based on the slowly gained facts the accumulation of which has occupied the 2000 years since that other blind conjecture was jumped at. If the labours of those ages could be superseded by such divination as is attributed to the predecessors of Aristotle, we should then be driven back on "the dangerous paradox" that science can exist without knowledge.[1]

The present is in truth only another instance of that

[1] One might as justly claim for the Ionian School the anticipation of modern chemistry when Anaximenes recognised air as the essential of all life, from which all plants and animals come, to which all return.

unphilosophical, as well as unjust criticism which, struck with verbal similarity, reads into vague guesses the precise statements of later thinkers, regardless alike of the context, and of the contemporary history of the science to which these were needful but in themselves unprofitable contributions.

But there is a more serious omission which raises grave doubts as to the competence of the critic to judge of scientific questions. The form of the reference to Darwin's views contains no allusion to geology, which supplies at once the most extended basis of facts for generalisation and in turn presents the widest field for the verification of the generalisation, assuming always that those links in the proof which experiment and observation of living beings can complete have been so completed. The Greek had neither geology nor palaeontology. He knew of alluvial formations, of upheavals and depressions of land, of fishes and shells found inland within the crust of the earth. But these were to him isolated facts. An eminent geologist, speaking of the writers of antiquity, says, "Standing altogether apart from fabled cosmogonies, there is foreshadowed dimly in their writings the *germ* of much that has of late years raised geology to the high rank it occupies among the sciences. I mean the close observation of existing phenomena of change and their application to time past and future. Unrestricted by the dictates of a mistaken orthodoxy, they knew no limit to time, and thus, almost in the spirit of prophecy, the Stagirite dared to assert that even as rivers and continents had heretofore sprung up and disappeared, so those that now are must also pass slowly away. The high acumen displayed by Strabo, in the application of the theory of upheaval to account for

the occurrence of marine shells at a distance from the sea, is all the more wonderful when we consider that the inference was supported by the most slender portion of what now constitutes the mass of geological evidence. Knowing nothing of the absolute geological mechanism of the earth, yet deeming the laws of nature for ever unchangeable—marking well the present and looking into the future—these men saw in the world an endless circle of mutability, which, in the language of Hutton, gave "no vestige of a beginning, no trace of an end": a marvellous inference by those who knew not that the events marking that wonderful history are recorded in tables of stone by the finger of Him who cannot lie.

The close observation of the Greeks is a frequent phrase—its proof is less frequently put forward. Observation, as the term is used in modern science, is a very complex process, of which the mere use of the eyes is the lowest stage. The curious mind of the Greek accumulated numerous facts, which had to him for the most part nearly equal significance and value. The unravelling of complex phenomena was, so far as the natural sciences are concerned, rarely attempted, Aristotle's great work on generation being perhaps the most signal exception. But, in anatomy, where of all others observation should yield the most appreciable results, little that is accurate has come down to us. I have attempted (*Ann. Mag. Nat. Hist.*, 1865, The "Malacostraca" of Aristotle), to show that in the class, Crustacea, the anatomical structure of the animals has been treated with scanty care, and the instances might be multiplied by going through the writings of other authors of that time. The great majority of the facts correctly noted are merely the simple facts which are readily appreciated by sight: yet

that even these were not always deemed of importance, is known to every one who has attempted to identify the animals or plants referred to by ancient writers. So far, therefore, from the ancients possessing the materials necessary for generalisations, for speculations as to the changes which animals may have undergone, it is doubtful if even the characters of living species were well, were adequately known—at least none of the early naturalists have recorded any descriptions whence the animals intended may be easily, certainly recognised.

How far then has their close observations carried them in geology? The alluvial phenomena on the Nile were the subject of shrewd comment by Herodotus, who applied what he learned in Egypt to the rivers of his own country. The evidence he adduces is excellent: the similarity of the off-sea bottom to the soil of the land, the existence of shells in the mountains, the efflorescence of the soil, the seaward projection of the delta, the difference of the soil of Egypt from adjacent lands. On such evidence he assumed the former existence of a Thessalian lake, of an estuary at Ilium and the plains of Maeander. Thucydides also dwells on the power of the Achelous to connect the Echinades with the mainland by its alluvium. Many passages might be cited in which no indistinct allusions are made to the decay of land, and the filling up of sea by the sediment of rivers. The most distinct notices of the superficial changes of the earth and the causes of those changes—earthquakes, rains, rivers—are contained in the treatise assigned to Aristotle but now believed to belong to a later period—the treatise on the universe (*De Mundo*) by Appuleius. But even including this authority (though for the present I would keep it out of consideration as not bearing on

the state of geological knowledge in the fourth century B.C.), what does it all amount to?

The remarkable passage in the *Meteorologica*, i. 14, has a rhetorical tone, a touch almost of enthusiasm, not common in the physical writings of Aristotle. In a subsequent chapter, ii. 3, 5, he traces the circles of the sea to the mountain tops and back to the sea, the passage being comparable with that in which Martineau goes over the same ground.

He describes the alterations of sea and dry land which the same region may undergo. As to the causes of these changes I cannot accept the view taken by Schwartz, preferring the rendering by Barthelemy St. Hilaire, the enthusiastic translator of this work. The words of the text are: "It is not right to consider the genetic development of the universe as the cause of this (alteration of sea and land): for it is ridiculous to say that the whole universe moves (literally, to move the whole universe) by means of small and petty changes, and the mass of the earth and its size is nothing in comparison with the whole heavens. But the cause of all these things must be understood to be that there comes up, after fixed periods, a winter like the yearly one, a great winter of this great period, and an excess of rain, and this is not always at the same place": but it is like that of Deucalion, a local one. He instances several places which have at one time suffered from such floods. The occurrence of such changes is removed at once from the field of observation to that of *a priori* reasoning, "Now since there is a necessity that the whole universe should undergo change, though neither genetic development nor decay, if the whole remains (or is eternal) it is of necessity, we say, that the same parts should not be

always covered by water (viz. seas and rivers) or dry land." The changes are slow compared with the duration of our lives—so slow that in the intervals the histories of nations are lost. Now at first sight all this might have been written to-day—so well does it represent modern knowledge. But the recognition of these gentle changes is vitiated by one fatal omission, the elevation and depression of the land. The power of the sea and rivers is able to affect the surface of the country, but no more. To complete the work periodical cataclysms are assumed as necessary. There is not a trace of a speculation as to stratified records of these changing waters: nay, the contrary may be assumed from the denial of the genetic development of the earth: for the slow addition of stratum to stratum would doubtless have presented itself as the stages of such development. Even the terminology did not exist whereby the strata could be described: these were either invented at a later date, or words were used in a special technical sense.

Xenophanes of Colophon is reported by Origen (in the third century A.D., therefore nearly 700 years after the founder of the Eleatic school) as conjecturing the types of fishes and phokes found in the depths of the rock at Syracuse and elsewhere to have been called into existence when all things were in a state of mud, and to have been thereafter desiccated. But this opinion is connected with a cataclysmal theory which, like most that survives of the philosophers of that period, had its source rather in morals than in physics. Periodic cosmical destructions were, says Origen, assumed by Xenophanes: by these mankind were removed from the earth, and the genetic process commenced anew. The vehement protests against the luxury of the times which are found in

the Fragments of Xenophanes render these cataclysms rather depuratory than geological. This mixture of physics and metaphysics is preserved in the derived Roman philosophy:—*Quandoque erit terminus humanis rebus quum partes ejus interire debuerint abolirive funditus totae ut de integro totae rudes innoxiaeque gignerentur, nec supersit in deteriora magister.* The idea of a periodic destruction was, as here put forward, only formally like that of Xenophanes and other early Greek writers, who assigned it as a cosmical phenomenon, whereas Seneca found it inherent in the earth itself. Still, the moral ground at both ages is the same—the philosopher's conviction that evil cannot last for ever—in fact, a form of theological teleology. This was, moreover, a part of the gain of Greek from foreign philosophy. The degeneracy of the race was, among the Egyptians, an undisputed belief: the removal of the degenerate by means of cataclysms, to make way for a better race, was part of their order of nature, subordinate, however, to the grander epochs of the Great Year. This subordination was lost sight of in the transfer, and the cataclysms appear as of greater or less importance in different schools of philosophy.

The Ionic School furnishes nothing of sufficient precision, as to the operations of nature, to collide with the tenets already mentioned. Their cosmogony was too purely metaphysical, as their country presents nothing salient in geological structure to call attention forcibly to it.

Far different was it with Empedocles; born in a country where the terrible effects of volcanic action were over present to the minds of men, and had given a character to their traditions, which, linking as they did

the terrible convulsions witnessed, with tales of the power or vengeance of the gods, he could not but be influenced in his doctrines by the phenomena around—phenomena which forced themselves on attention far otherwise than did the tame Ionian scenery on that of Thales and his successors. Xenophanes and Aristotle dreamed of subterraneous reservoirs of water; Empedocles, born in a volcanic country, and conversant with the Pythagorean doctrines, familiar too with the social and political unrest of a region whose inhabitants seem to have been at all times impelled by strong passions, whose enthusiasm even has a tinge of fierceness in it, seems to have been more than usually influenced by the external conditions under which he lived. The struggles of nature he looked on as the counterpart of the human conflicts around him—neither seemingly under control of any regulating law—both equally short-lived and recurrent.

Nor were apparent confirmations of this doctrine far to seek; the tertiaries of Sicily supplied fragments in which the cosmogonists found proof of the earlier monstrosities to which chance gave rise during the progress of all things from chaos, data whence Ovid probably drew his different view, and constructed his inverted sequence of the ages.[1]

[1] Though bearing very remotely if at all on my present argument I venture to urge this as an additional example of the impress which geological movements have received from the localities in which they originated, or whence they derived a fresh activity. The tame Ionian scenery left its sages free to ponder over human thoughts and actions, and to sink into that verbal analysis wherein consists some part of their philosophy, undisturbed by the contemplation of active terrestrial phenomena. To Aristotle, the traveller, convulsions of the earth were too slightly known for them to figure largely in his thoughts or system:

The geological speculations of Empedocles are so mixed up with what has been called his palaeontology, that they cannot be spoken of apart. I shall therefore speak first of the fossils known to Anaximander, which are the better entitled to consideration that Cuvier has made them the occasion of a criticism amply illustrative, as Sir C. Lyell has pointed out, of the kind of assertion against which there is much need of protest. Lyell has pointed out the rashness with which the French naturalist, doubtless from not having consulted the original texts, found a progressive transmutation comparable to that of Lamarck, in the reports of Anaximander's doctrines as given by Plutarch, Eusebius, and Censorinus. The sum of these fragments is that the first animals were generated in slime by the action of the sea, were covered with prickly integuments, which

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water was a more familiar agent, of which subterranean reservoirs usurped the place assigned by the Pythagoreans to fire. That sect, whose stronghold may be said to have been Southern Italy, had this particular tenet confirmed at least, if not actually suggested by the land in which their brotherhood flourished, as Chaldean astronomy was nursed on the open plains whence the heavens could be so advantageously surveyed. Empedocles came under a like local influence, both he and the Pythagoreans finding in the strata beside them the basis of their respective notions as to the events of previous ages. In the same way, to come nearer to our own time, Neptunism sprang into a creed in a limited district whose igneous rocks had somewhat of the aspect of sedimentary strata. And when, at the beginning of the nineteenth century, geology assumed much of the character and most of the tendencies it long showed, these were claimed by Cuvier as the inevitable consequence of his successful researches among the strata of the Paris basin. For the geology of to-day has slowly resumed the character of a physical study which it had before Cuvier gave to fossils so prominent a place, and before the Geological Society of London, under his inspiration, accumulated its observations in a country as rich as France in well-preserved, easily extracted fossils.

being thrown off, the animal dies: that man came into being in the form of a fish, since as at present constituted the human young are incapable of self-support, but after a time, when they are able to look after themselves they assume their proper shape. Such is the evidence given in the authorities cited by Lyell: but Origen (*Philosoph.*, p. 1, ed. Mullach) has a slightly modified statement, for he says that "animals came into being under the evaporating power of the sun: that [man] came into being in another animal—one similar to a fish—in the beginning." If this is a correct account of the facts, the gap between Anaximander's primordial animals and man is very small, at least it is not necessary that any long interval should have elapsed: the distinction between the two speculations is therefore clear. Schwartz, in commenting on this passage, ingeniously suggests that the philosopher may have himself seen the remains of fishes, perhaps of Devonian fishes, taken out of the solid rock. He gives no reference to any notice of the finding of *coccosteus*, *cephalaspis*, presumably the forms Anaximander had in mind, in the Devonian rocks of Asia Minor where the philosopher might have seen them, assuming, as I have done, that these were the forms which he had in view. Moreover, he goes, it seems, too far, if the words of Origen are correct, in assigning fish as the progenitors of the human race. Origen says the forms were fish-like: and the words of Plutarch (*De Plac. Philosoph.*, v. 19) quoted by Schwartz himself (about the prickly integuments which were shed) indicate a belief in temporary investments, not necessarily in forms of such permanence as require transmutation to give rise to the higher creation. We may, in fact, compare his notion with what is known regarding the metamorphosis of insects:

the chrysalis might be compared to a worm, giving place to an animal of a higher grade, which had, while still unable to provide for itself, passed the time of helplessness under the figure of a lower. Be this as it may, the Milesian held, as did all who had been pupils of the Memphian priests, that all things returned to their primitive elements.

Empedocles too was aware of the existence of fossil remains, but these seem to have been of a different kind from those which Anaximander had seen, unlike those which Herodotus under the guidance of the observers of Egypt had speculated upon. These at least which have most distinctly impressed his mind, and which figure in his poems, are such as might, according to Schwartz, be found in a Sicilian cave. It is with diffidence that I venture to differ from Schwartz, who to a knowledge of the history of geology adds an enviable familiarity with ancient languages—who, as his countrymen affirm, knew Greek better than many do their own mother tongue. But I think his enthusiasm in favour of Empedocles has carried him too far. He compares remarks of the Acragantinian to the demonstrations of a Cuvier, a Wagner, or an Owen. His work *On the Failure of Geological Attempts in Greece*, by Julius Schwartz, London, 1862, remarkable for the knowledge of Greek authors which it shows, is unfortunately little known in this country. He has adopted the arrangement of Sturtz, and to this may perhaps be traced opinions which it is right to combat. The arrangement of Mullach (*Fragm. Phil. Græc.*, Paris, 1864) seems to me to offer a more coherent whole: but this is a matter of opinion, for the task of reconstruction requires powers akin to those displayed by Cuvier or Owen. It is with literary im-

pression that one is concerned, not with the comparison of scholarship of various editors.

Empedocles believed in the fortuitous concourse of atoms. His two principles, attraction and repulsion, discord and love, or whatever other terms may be chosen —are those on which the chaos or order of the world depends. Superior to these two is Necessity, the eternal will of the gods: but the part played by this power is as obscure, though less distinctly stated than the "mind" of his contemporary, Anaxagoras. He seems too to have recognised another set of divine powers or principles, which, however, take small part in his physical speculations. He has clear notions of volcanoes, shares with the Pythagoreans a central fire and subterranean streams of fire, and asserts the elevatory power of that fire: but it is merely telluric, has not the cosmical value assigned to it by the Pythagoreans.

It is, I think, clear, that the two principles of attraction and repulsion form a sort of quaquaversal proposition, both being alike but in turn the causes of order and of chaos. But the general law is also clear, that the domination of either power gives rise to a period in which the condition peculiar to each prevails. The course of events is summed up in the Pseudo-Plutarch. Empedocles says, "the first origins of plants and animals were by no means perfect, but scattered in disunited parts: the second stage was the union of similar parts: the third, of those parts which are developed from each other: the fourth origin is no longer from similar parts, as from earth and water, but they (the beings) are generated by each other."

Schwartz finds in the remains of Empedocles the stages of this series: but, oddly enough, the differ-

ences of text which enabled him to find them and have made me fail, are noted by neither editor. The form which Mullach gives his text is certainly confirmed by the order stated in Lucretius, who, authoritative in other cases, is nearer by centuries to Empedocles, presumably therefore better informed. I am inclined to believe that the lines which inscribe the joint influence of Hephaistos and Aphrodite in the production of the components of a body are embryological, since it and the passages concerning the different qualities of the male and female are in keeping with the Aristotelian phraseology if not doctrine. As the text now stands, it seems hypercritical imagination to find in it a parallel to the Pseudo-Plutarchian sketch. Joannes Philoponos (*ad Arist. de Gen.* I. 18) is cited as stating that, at the close of the chaotic period, all those disjecta membra "endowed with the vital principle and with sensation or sensitiveness were in the earth, and from these, as from many animals, were generated each of the animals." Here Aristotle's evidence is of value, as given above.

Moreover, as these scattered parts preceded in age the *βουγενῆ καὶ ἀνδρόπρωρα*, and as by the Pseudo-Plutarch's own showing, reproductive power was wanting to them, the case falls to the ground.

Palaeontology there was none. The Greek saw clearly the facts, and a remarkable account of them it is: but the sequence was beyond his power. The eternal circle of matter—the periodic revolutions—the start afresh of all things—this is all we find. The power of volcanoes is clearly known,—the reproductive power of water not so well as by the Ionian school. Nay, the classification given by Sturtz as an epitome of Empedocles—that

namely by which animals are divided into terrestrial and aquatic, according to the predominance of one or the other primitive element—puts an end to all possibility of coherent succession of life. Here Empedocles gives us, as in his scheme of the world, parts which may indeed form a whole, but the inspiration has yet to come.

Aristotle was aware of the existence of what we call fossils. Fossil fish he mentions as living in the ground motionless, and as being dug out of the ground. Their existence he connects with their colder habit and less urgent need of respiration. He regarded them therefore as parts of the present order of things, and thus the passage from the *Meteorologica* already quoted can be no more than a speculation in physical geography.

As an illustration of the thesis already advanced concerning the local character of ancient cosmogonies, the doctrine of Anaxagoras may be referred to. He too was a native of Asia Minor: his opinions therefore lack the Sicilian stamp. Earthquakes were to him the effects of subterranean air. But, like Empedocles, he taught the eternity of matter, and put into a clear formula that the origin of things was a mixture, their destruction a resolution. The ὁμοιομερῆ of which they consisted—similar particles whose combination went to make up particular bodies—existed as such in a chaotic state,—were potentially the elements of future bodies, but received the impulse to combination from without, from an all-pervading νοῦς, or Intelligence. The commencement of this era of intelligence was that of the present order of things seemingly—an order which has not yet run its course. But though there is no formal indication of periodic changes, such as Empedocles believed in, it seems as if there were

a reserve in the fragments of this author—a tacit admission that the resolution of the ὁμοιομερῆ might again happen. But, be this as it may, it is evident that as a whole the uniformity which Anaxagoras asserted is inferior to that of Empedocles: for while the latter accepted catastrophes as a part of the order of things, Anaxagoras seems unaware of their import. In one passage he speaks of the stones as growing by the creation of the earth, but adds that they commonly come out of water—a very remote hint of aqueous deposit: yet, vague as it is, it is nearer stratification than any words of Empedocles.

Xanthus the Lydian, who flourished about 480 B.C., is cited as having knowledge of fossils: but, clearly as he speaks of them, his notion that their inland position is the result of gradual desiccation of the sea removes him from the list of possible anticipators of modern geology.

It is difficult to deal with the Pythagoreans. Of the Pythagoras whom Maurice thinks it most probable among guesses to assign as the pupil of Anaximander, who returned from Egypt and Persia rich in knowledge, gained from the philosophers of those countries, who established in Magna Græcia orders, as Thirlwall calls them, which must have exercised great influence on the social state of that region, of the Pythagoras to whom Aristotle and Plato yielded a respect in which his followers did not share, nothing remains whence his physical doctrines may be fairly judged. Accounts of his teachings there are: but these are preserved either by men who were not in strictness his pupils, or by Neo-Platonists in whose writings the old philosophy appears shrouded by a Christian veil. Sir C. Lyell has taken the account given by Ovid of Pythagorean philosophy as

representing the then beliefs of the sect in the Augustan age: and it is fortunate that such an account of the physical creed of the school should have been preserved at a period prior to that of the wider influence of Christianity, whose similarity to the ancient faith, in its assertion of the divine relations of human society, might have, at a later date, led to the attribution of a part at least of the Hebrew cosmogony to the heathen system. The fragment concerning nature, attributed to Ocellus Lucan, opens with the assertion of the eternity of the world, and of the absence in it of any sign, either of beginning or end, words almost identical with those used by Playfair. The commentary of Hierocles, on the Aureum Carmen, contains similar though less distinct phrases: but the great bulk of that work is a strange mixture of Christian and heathen theology and morality. The insensible something, that changed state of opinion superadded, may be felt more readily than defined in the perusal of Hierocles' lengthy disquisitions, and their comparison with the terser fragments of the heathen Archytas the Tarentine.

Lyell in the *Principles of Geology*, i. 17, thus summarises the passage in Ovid, *Met.* xv. 165 *et sqq.*

> Nothing perishes in this world, but things merely vary and change their form (165). To be born means simply that a thing begins to be something different from what it was before, and dying is ceasing to be the same thing (215). Yet though nothing remains long in the same image, the sum of the whole remains constant (254).

These general propositions are then confirmed by a series of examples—all derived from natural appearances

except the first which refers to the golden age giving place to the age of iron. The illustrations are thus consecutively adduced:

1. Solid land has been converted into sea (262).
2. Sea has been changed into land, marine shells lie far distant from the deep, and the anchor has been found on the summit of hills.
3. Valleys have been excavated by running waters and floods have washed down hills into the sea (267).
4. Marshes have become dry ground (268).
5. Dry lands have been changed into stagnant pools (269).
6. During earthquakes some springs have been closed up and new ones have broken out: rivers have deserted their channels and have been reborn elsewhere, as the Erasinus in Greece and Mysius in Asia (270-280).
7. The waters of some rivers, formerly sweet, have become bitter as those of the Anigros in Greece, etc. (280).
8. Islands have become connected with the mainland by the growth of deltas and new deposits, as Antissa and Pharos.
9. Peninsulas have been divided from the mainland and have become islands.
10. Land has been submerged by earthquakes.
11. Plains have been upheaved into hills by the confined air seeking vent.
12. The temperature of some springs has varied at different periods.
13. There are streams which have a petrifying power.

14. Some rocks and islands after floating have become stationary and immovable.
15. Volcanic vents shift their position.

The opening sentences of this extract are identical with those of Ocellus. Its whole tenor, extended greatly in comparison with the Aristotelian exposition of superficial changes, and distinguished from the views of Empedocles by the subordination of volcanic or elevatory forces in the course of things which thus go on without catastrophic interruptions, shares however the censure justly passed by Lyell on all Greek science—"that it never compared attentively the results of the destroying and reproductive operations of modern times with those of remote eras, nor had it ever entertained so much as a conjecture concerning the comparative antiquity of the human race, or of living species of animals and plants, with those belonging to former conditions of the organic world. The Greek philosophers had studied the movements and positions of the heavenly bodies with laborious industry and made some progress in investigating the animal, mineral, and vegetable kingdoms. But the ancient history of the globe was to them a sealed book: and although written in characters of the most striking and imposing kind, they were unconscious even of its existence."

From this censure even Strabo is not exempt: for though he, as Lyell points out, asserts the safety-valve view of volcanoes in anticipation of modern theory,—an anticipation, by the way, purely conjectural, and though he lays down the axiom that explanations of these things are to be sought in things which are obvious and in some measure of daily occurrence, as deluges, earthquakes, and volcanic eruptions, yet no linking of

the past, of the remote past, with the present is attempted.

Enough has been said to prove that at the time of Empedocles no theories existed in any way comparable with those of modern geology—that the knowledge on which alone such theories could be built had not been acquired. Much was known, but only such phenomena as were obvious, and though the reasoning from these obvious facts has a specious resemblance to geological speculation, yet on further enquiry the resemblance fades, only vague guesses survive, as isolated as the facts whence they proceeded. If it is asked why these guesses remained so long barren and unproductive, the answer must be sought partly in the purpose for which they were put forward, and the nature of the systems of which they formed a portion—partly in the character of the people themselves.

All the Greek speculations were cosmogonic purely: of an earth without man the Greeks seem to have had no conception; for even in Empedocles the indications are faint of any such hypothesis having been engrafted on the Greek mind by its Oriental teachers. In consequence the earth as it is was to them the earth as it had been: catastrophes might come, but they were either local or subversive of all that existed. A portion of mankind was destroyed, or if the whole perished, another race of men appeared. Such changes were effected for moral purposes and altered only the surface. That these alterations left records in the earth's crusts was not dreamt of.

Again, the chain on which these heads of speculation were strung was not one of physical but of metaphysical reasoning. They were, more or less, but all to some

extent, and that the greater, the happy illustrations seized by active, fertile imaginations, for the purpose of bearing out their views of man and his conditions and relations—not studied by themselves and for themselves.

This brings us to the third source of explanation—the genius of the people among whom these theories sprung up. Schwartz summarises their character in pithy words of grotesque force which only his familiarity with their history and literature saves from the suspicion of personal animosity. "All the five senses appear in them highly developed. Perhaps this exalted them in a manner so unfavourable to the modern direction of science—they were conducted as positively in their philosophy by their auditory organ as by their extremely fine nose or fondled gustatory nerve: perhaps this caused, as to the actual configuration of things on the surface of our planet, their utter indifferentism—that their imagination, frantic as it was, rendered their most cursory conceits, their most notable lies, a benumbed group of statues, a life-long object of their adoration. Preferably sculptors, painters, musicians, apt to perform at religious gazing as on a seven-chorded lyre—lawyers, physicians, foot-soldiers, seamen, cooks, jesters, gymnasts, coachmen on trijugal, quadrijugal cars—subtle, ambitious, perfidious, quarrelsome, never so prone to curiosity as to pertness in their conclusions—always more acute than profound, thus fulfilled the Greeks their political duty, and such is their fame, transmitted on every stone they cut, on every tablet they inscribed."

Part only of this is true, and that part only as regards physical observation. In astronomy Lewes maintains their deficiency in exactness: and Dr. T. Young expresses a natural wonder that men of such great talents and

varied ingenuity should never have thought of subjecting their conclusions to the tests of experiment: he has not referred to the feeble experiments (?) which emphasise his wonder.

This seems to be the real cause of the Greek failure in physical enquiries. Their impulse in that field of thought seems to have been almost exclusively derived from without: and the chilling influences which brought that impulse to nothing, which reduced natural science to a marginal commentary on other philosophies, must be sought in their political condition. Each state had a government which it believed to be the best, for which it was ready to fight to the death. In small states the segregation of a class of thinkers apart from the actual politically interested workers is impossible. By nature and circumstances compelled to politics, the exceptions are few in which the philosopher was apart from the theorist in state craft: and these few exceptions, as notably Anaxagoras, were given up to verbal puzzles. Whatever bore as an illustration on the principles of government, or primarily on the constitution of man's moral and intellectual being, was adopted, elucidated by metaphysics, passed into the system of the adopter, and thenceforth ceased to form a part of a distinct field of enquiry.

It may repay future discussion to learn how far short of the knowledge needful for a theory as to the origin of species the Greeks fell in respect of zoology, as they manifestly did in their geological observations, geology it were too absurd to call it.

JEWISH MEDICINERS.[1]

AN ADDRESS TO THE JEWISH LITERARY SOCIETY.

[Date 1899.]

Early Hebrew medicine was no growth; whatever may have been borrowed from the Egyptians before the Exodus, the embodiment of the law in the Mosaic books represents a fundamental conception which must never be lost sight of, which ruled conduct with absolute control down to the period at which I close my remarks—the belief that whatever happens comes direct from the hand of the Lord. The Jews were the chosen people, under the direct supervision of the Lord; the regulations presented to them in the Law of Moses had for their object the preservation of the people in the most perfect physical condition and the purest moral state possible, and the maintenance of the closest relations with their God. Hence the exclusiveness, which was not a *national* character, but had its seat in religious conviction and obligations. If the Sadducees had a belief in the utility of worldly means for dealing with worldly emergencies,

[1] The Hunterian Library contains MS. copies of works by Isaac ben Salomon, Actuarius, Platearius, Trotula, Constantinus Africanus, Mesue, and portions of treatises by other mediaeval writers on Medicine. In making the Catalogue of the Library I had to attempt the identification of these works. The result of this work was summed up in an address to the Jewish Literary Society of Glasgow, and of this address the above is the substance.

they were an offence to the Pharisees, whose trust in the Lord was implicit. Time modified slightly the rigidity of this exclusiveness, but did not remove the conviction that diseases were sent by God as chastisements. I do not speak of ordinary ailments, such as those of the priests due to the prescribed clothing to be worn in the service of the Temple—for these ailments physicians were appointed at an early date; I refer to such affections as leprosy and pestilence, which we find in the Bible as direct evidences of Divine displeasure. There were in fact among the early Hebrews two subjects of Medicine —(*a*) diseases sent by God, to be dealt with by the Levites as intercessors for the people; (*b*) injuries for which medical aid might be sought.

In a periodical of last century, *Der Jude*, there is a full account of and rules for the visitation of the sick. It is laid down that the sick man must have a physician lest he be counted a suicide. It is also laid down that the doctor must be conscious of and convinced of his own skill, and satisfied that no better physician, no more experienced person, is available, else he will be held as a murderer. But even then (1770) it is candidly declared that in grave internal disorders the sick man should have no physician, but trust in God. How far this is founded on the censure of Asa is not declared, but it is a curious commentary on this faith that already in Sirach it is said, "Him that breaketh the Law, let him fall into the hands of a physician," for him there was no help from God. There was not then, be it remembered, the same ground for sarcasm that has made in more recent times the doctor a subject of not always good-natured jest: Isaac the Jew has left record, in the tenth century, of the singleness of mind in the profession; and it is told of

another who wished his son to study, being moved to this advice by the honours accorded to a successful student, that his evil thought was punished and his son came not to honour.

It has been objected that the precautions ordained by Moses in the case of leprosy have no counterpart in the case of pestilence. I do not see any force in the criticism: the pestilence is a disease still occurring in the East, and the history of that, or rather those epidemics at Aleppo 1760, '61, '62, shows that precautions were not of any avail, that the beginning and progress were under no apparent rule. Moreover, as the stroke of the Lord, the pestilence was not one of the diseases of the people. "It is better to fall into the hands of the Lord than into the hands of man." After the Dispersion the Jews enjoyed a singular immunity from pestilences which visited Europe—sometimes a fatal immunity for some persons; for in 1161 no fewer than 86 Jewish physicians were burnt in Prague in acknowledgment of their inability to cope with an epidemic which ran its brief course of destruction but spared their race. The malicious puerilities of alleged poisonings of wells are mere excuses for acts which were as rational as if we were now to burn negroes in South America because they do not suffer from the yellow fever, which is fatal to white races.

As the Mosaic Law was not a scientific treatise, as its instructions were for the guidance of the priests, the only intermediaries between man and God, we need not complain of omissions which would have been irrelevancies had they been inserted. The general health regulations were of remarkable completeness, extending as they do to details of moral as well as of physical conduct. Even

bodily imperfection was considered; the service of the Temple was forbidden to anyone who was imperfect or mutilated, and Hyrcanus was deprived of his high office after the intentional cropping of his ears by Antipater, who well knew the degradation that must follow the savage act. It is easy to recall the instances when the priest intervened, when Moses interceded for Miriam, or that sublime picture, when Aaron with his censer stood between the living and the dead, and the plague was stayed. Such being the key-note of Hebrew Medicine, the growth of the profession is of extreme interest, both in respect of any actual gains to knowledge and of the opinions which overlaid the practice.

At first their God was the sender of disease, and the healer when the punishment sufficed. But the Captivity brought the people into contact with other modes of thought, and thus came the added notion, held only for a short time, that evil spirits too had a share in the infliction of suffering. It is difficult to unravel the history of Mysticism. It seems fair to credit Zoroasterism with some share in that foreign growth, while Greece contributed Pythagorean doctrines. Certain it is that a sect of mysterious history, the Essenes, appeared in the troublous times when some Chasidim (the pious), later known as Pharisees, respected the oral as well as Ezra's written law, while others, the Sadducees, deemed the written law sufficient. The Essenes, among whom John the Baptist is counted, carried the regard for purity to extreme lengths, and to guard themselves against defilement practised a habit of life to which monasticism is the nearest equivalent. Philo is the first great name among Alexandrian Jews who formed a flourishing colony, and whose descendants justly complained that

Christians revenged the death of Jesus on those whose ancestors had quitted Palestine long before that event, and who were therefore in no way responsible for it. The Egyptian monarchs had favoured the colony, and to them, especially to Ptolemy Philopator, is due the devotion of the Alexandrian Jews to the translation of their books into Greek, a task round which a miraculous legend was woven in aftertimes. Philo was well versed in Greek philosophy, which it was his object to reconcile with the Hebrew religion. This he sought to accomplish by mystic interpretations and symbolical readings of the old books, the result of which was that the ancient faith lost its simplicity, and therewith its hold on men's minds. Those who clung to the Law were branded by the Gentiles as atheists because they refused to accept the gods of the western world, and were hated as exclusive because the old proud boast of the "peculiar people" was no longer understood, because they who cherished it did not see how concession might have helped them.

The old agriculturists and flock-keepers had come into times when they were not allowed to hold lands, and when handicrafts were forbidden them, when political reasons gave some semblance of an excuse for selfish restrictions now pursued in other directions from personal motives. Commerce, to which they were not naturally prone, was the only resource left to the mass of the people, philosophy to the more cultivated. There was a general impairment of the taste of the race consequent on the Dispersion, and this decadence extended to the language of the common people. An external stimulus was needed to rekindle the fire of Hebrew poetry: this was afforded by their contact with the Arabs. Even the

Koran owes more to the sacred books than distorted reminiscences. The warrior spirit of this branch of the Semitic stock was in full energy; its ambition was called into full play by Mohammed. Something more was needed. A general of the Caliph Omar is credited with the destruction of the library of Alexandria: it is a doubtful charge, even if it were not a positive benefit that so much of moth-eaten tradition had been swept out of the way of civilisation. Let the general have blame or praise, the Caliph himself certainly was a friend to knowledge.

Less than a century after the opening of the Mohammedan era, a great activity of thought was at work under the Ommiade dynasty. The first Caliph gave the Jews privileges which were enjoyed under his successors, and Damascus and Bagdad were seats of learning wherein were studied all that could be gathered from Greek, from Jewish, from Chaldean sources. Medicine had a prominent place among the studies, and the Alexandrian influence was infused through Abdel Malik ben Abhár Alkināni, a Christian, afterwards a Mussulman. The activity was prodigious: Greek MSS. were imported and translated, Nestorian Christians being the chief physicians and those who enriched Arabian literature with the treasures of other tongues.

It is from this time not easy to disentangle Arab and Jewish contributions to medicine: still more difficult to find Jewish physicians who were contented to limit their contributions within the bounds of their own profession. The physicians were then indeed learned, skilled in all departments of human knowledge, philosophy, linguistics, and theology, the Jewish devotion to wide culture being especially noted and noteworthy.

This combination of doctrinal lore and medical knowledge had its drawbacks; skill in the unravelling of textual difficulties, mastery of controversial dialectic, gave to medical treatises a peculiar character. There was subtility in discussions regarding imponderable agencies; heat and cold, dryness and moisture were assumed as the chief properties of man as an organism, and symptoms were considered in reference to these rather than to diseases. One toils through pages which have a tincture of the moral law in the hope of finding facts regarding definite diseases, sometimes only to find that the whole depends on the evil adjustment of warmth and moisture conferred on the patient prior to his birth. The case is even worse in early Christian medicine, for to the controversial skill of the churchman was added that of the astrologer, and conjunction of planets shared with Aristotelian logic in establishing the diagnosis and guiding the treatment of what we now study in and for itself. Vast as was early knowledge, just as were early opinions regarding plants and their medicinal properties, even these were overlaid, sometimes misdirected, by fanciful preconceptions as to their relations to the four properties already mentioned. There was more skill on paper than in actual observation of ailments: that is the first impression. But in reading the works of Isaac one sees that, after all, there was a sound body of accurate observations underlying all this; and one hopes that the practice was more in consonance with common-sense than the descriptive language, and was as useful as that of modern medicine. The surgery, if rough, even coarse, was in the main sound: in ophthalmic surgery the practice was better than the small amount of anatomy then known leads us to expect.

In Spain, under the Ommiade dynasty, the Arab found a more stimulating climate and underwent invigorating contact with western races, giving and receiving influences which served to modify the knightly standard and to raise that of culture in Europe. Their mild treatment of the Jews whom they found resident in Spain (where they had formed an important part of the population for several centuries) had a complex origin. Descended from a kindred stock, and animated with an equally strong antagonism to Christianity, the Jews saw in the Arabs deliverers from the cruel yoke of the Visigoths. Under the new rule the academy at Cordova came into existence, and schools were fostered under the control of teachers of recognised ability. Under Abdar Rahman, a Jew, Chasdäi ben Schaprout, a native of Spain who had studied medicine at Cordova, became finance minister, and enjoyed the Caliph's confidence to such an extent that he was employed on important diplomatic missions. To him is due, in conjunction with a Greek priest Nicolaus, a large amount of Arabic translations from Greek authors. The Spanish schools became a centre of attraction for all lands; the libraries were numerous and well stocked, the scribes many and busy. From the Peninsula spread through Europe a copious stream of literature, introducing knowledge not previously accessible, not previously known to exist.

It must be owned that, judging it from the modern standpoint, much of this literature was of little worth; it was empirical knowledge, the product of observation—for the most part uninstructed observation; it was guided by no inductive reason, lacked the basis even of correct anatomy; nevertheless, gleams of the direct common-sense of the true physician occur.

From this time on our knowledge is almost *nil* of the actual practice of the profession: systematical theoretical works abound. The remedies, balsams, electuaries, oils, are chiefly European, little of Eastern origin survived. The history of Medicine is thus chiefly of literary medicine. The ordinary practitioner, Jew or Christian, does not bulk largely—has left little record, save occasional references to men who, otherwise unknown, had tried certain remedies and found them useful. The writers, literary physicians, were in touch with the practitioners, but of the ordinary life of these latter we know nothing. Even the *Thesaurus Pauperum*—the poor man's treasure—even this popular treatise is an unsafe guide for the uninstructed. The most popular ascription of this work is to Honein, though it is probable that the uncertainty on this point is due to the preparation of more than one such treatise at different times, by various authors.

Isaac the Jew, in the tenth century, wrote a *Guide to Physicians*, which will bear perusal now. Hear some of his precepts: "Let your first visit fall at the exacerbation of his illness." "Think well about simple remedies of which you have had no experience." "Most patients recover by the help of nature without the physician's aid." (This is a modification of the Hippocratic maxim, "To help or not to hurt.") "If you have a choice between nutritive means and drugs, use the former." "Use only one remedy at a time." "Think of your fee while the patient is ill: when he is better he forgets." "Make your fee as high as possible: you get no thanks for gratuitous work." There is great shrewdness throughout, and the worldly advice bluntly set down in the foregoing extracts is, after all, the common

faith and practice of Christian, Arab, and Jew; not all are so honest in their admissions. Isaac ben Soleiman had a high standard, and his influence must have been for good. It seems strange that Chasdäi, notwithstanding his eminence and experience in affairs, in spite of the place which he saw his co-religionists take, should have shared the common belief that a people and a religion without a country had neither firmness nor vitality. Every name one finds on the roll of distinction, every Jew who won position as a physician, was a scholar, and that meant theologian for the most part. The race strove towards the light at a time when Christians were content to tread the narrow circle to which the intellectual darkness of scholasticism condemned and accustomed them. Johali Marinus, 995-1050, was a scholar; so was Shishet Benvenuto, in Aragon. The Tibbon family held high rank among the Jews of the south of France. Judah ben Saul was a distinguished physician, and with his son, also a physician, translated important works. But the country which records them witnessed the rise of the greatest Jew prior to Spinoza. Moses, the son of Maimun, was born in Cordova in 1135, and educated by his father, who, during the tyranny of Abd-el-moumen, accepted in turn both of the alternatives presented by the Caliph, first professing Islamism, afterwards leaving Spain for Africa. At last in Egypt the refugees got peace. Maimonides and his brother earned a livelihood by dealing in precious stones, until the death of the elder brother at once broke up the partnership and the business. But meanwhile Maimonides had won a patron powerful and wise in Al Fadhel, Kadi under Saladin. Recognising the utility of the Jew, he made him one of the attendants at court, and assured him of

the means of devoting himself to science. But this security did not assure him of ease: others besides the Kadi knew when they had a wise friend. Samuel ibn Tibbon, who afterwards translated his writings, wished to place himself under Maimonides' instruction. The sage wrote, discouraging him on the ground that he could not promise him the attention which would make his sojourn in Egypt worth his while. The picture of his daily life, if it is exaggerated, as became one who did not desire a friend to undertake a serious step without knowledge of the risks, still tells of much labour as well as untiring assiduity in discharging duties. The day was spent between the daily visit to Cairo, and interviews with patients at his own home, besides consultations on points of the law, of which his enormous knowledge made him in some measure an arbiter. Little time for study, yet the works of this busy man rank only after—if indeed they are after, save in time—those of Ibn Gebirol. It is a familiar epigram that from Moses to Moses there was no one like Moses; but Spinoza did not come between them: fact is a little sacrificed to phrase, for neither Ibn Gebirol nor Spinoza deserve to be omitted from any comparison between Jewish thinkers. Avicebron, or Avicembron, a more familiar name than Solomon Ibn Gebirol, was not a physician; but it is necessary to consider his work if we wish to understand the place of Maimonides in the history of philosophy and religion. The materials are to be found in the *Mélanges philosophiques* of Munk, who, besides being the discoverer of Gebirol under the supposed Arab designation of Avicebron, has given sketches of several Arab and Jewish philosophers. May I remark that the respective merits of Arab and Jew, as contributors to the progress of thought, have their

partisans? Perhaps it is more correct to say that partisanship is more copiously and emphatically asserted on behalf of the Arabs, as if anti-Semitic feeling were more tolerant of those who follow the Koran than of those who take as their guide the books of Moses. It is said that the Arabs were specially gifted in philosophy, for which the Jews were slightly endowed. There are certain names which stand out in the history of the Jews—Philo, Ibn Gebirol, Maimonides, Spinoza, Mendelssohn: you may call them the crests of the wave, but there was continuity of thought between their epochs, Jewish philosophical tradition was uninterrupted. Alexandria was the home of Neo-Platonism: Karaism, a development of the eighth century, had more than religious significance—it was a motive for a closer study of philosophy, it determined a more exact knowledge of the Hebrew language. No nation has an exclusive claim to any science: the wave of knowledge passes over the earth not always in the same direction; its crest now falls here, now there. The real truth is that in the third chapter of Genesis we find the explanation of the absence of philosophic studies among the race. The Hebrew had not his notions of the existence of God, of morality, of knowledge of good and evil, as the fruit of syllogism; they were not won by wrestling with thought, but inherited as part, integral part, of the divine revelation at Sinai. It was his religion that he did not philosophise, not his reluctance, still less his incapacity.

By circumstances, as of the Captivity and residence in Egypt and elsewhere after the Dispersion, the Jews were led to add to their knowledge opinions formed by other nations, in schools remote from their own in motive and purpose. Perhaps their most kindly adoption was from

the Persian school, which equally with the Jewish was hostile to idols. Certain it is that there are traces of this influence in some of the later Hebrew poetry. But contact with the civilisation of Greece and Rome could not fail of effect. The philosophy of Aristotle and Plato had much to do with future progress. I cannot enter into even a brief *résumé* of the stages of thought prior to the eleventh century; suffice it that the Peripatetic philosophy dominated in the long run, notwithstanding the strenuous efforts even of some Jews in south France —reactionaries who not merely opposed one school of thought, but wished to suppress all, and sought to forbid study of profane matters until a certain age, 25—nay, even 30 was proposed. The attack on philosophy was not to arrest knowledge, but to confine the search for it within the limits of the Bible and the Talmud. It was led by Jehuda Halevi, who early in the twelfth century wrote the book *Kozari* as an embodiment of his antagonism.

This was not the effort of a fanatic from ignorance. Halevi was a physician—a man of social position, high culture, and a poetic gift which has left valued poems. Nor was he narrow from isolation; he had travelled even to Palestine. We must look carefully for the explanation of the paradox that the enemies of progress were those who ought to have been its most assiduous helpers. In all times of great excitement we become aware of the two antagonistic forces which never require to declare themselves under ordinary conditions. Progress and reaction merely represent the extremes of opinions which scarcely made themselves felt so long as the current ran slow. Time would have brought the desired changes without doing violence to any latent

prejudice. But there are men who cannot wait; there are circumstances which render delay well nigh impossible. If the roots of religion are or seem to be in danger, the fanaticism of the learned is even more dangerous, even perhaps less controlled, than that of the mob; it certainly has more skilful weapons at command. The struggle was not quite new. Saadïa had in the ninth century deemed it worth while to show that in philosophy was a firm basis for religion—that reason and faith were not at variance.

The history of the book *Zohar* is curious; it was a fraud in harmony with the spirit of the times. No one thought his words of such weight as to command respect, or at any rate it was thought they might fare better if imputed to some one else. In the case of the Jews this led to a confusing uncertainty as to the nationality of an author; one has often to ask, is the name a *nom de plume*? Moses da Leon went further: he perpetrated the fraud in the hope that the supposed author would better command the sympathy he could only hope to slowly win in his own name. The book was supposed to have been written in the second century by Simon ben Yochai, and to have lain hid till Moses da Leon found it. The fraud was successful in so far that it was not detected in time to deprive it of all use, though Moses da Leon's widow is said to have admitted, evidently innocently, that the book had been written by her husband. But otherwise failure—deserved failure—followed; all the power of the Kabbala was let loose.

"Allegorical resurrection" is Martineau's happy phrase for the interpretation of the Bible which held sway after the temple had disappeared. With that went the central symbol—the personal idea of religion, a loss not to the

common people merely, but even to some of the learned, who had the strange notion that the stability of religion had been shaken when its greatest symbol on earth had been destroyed. There was preparation for the "allegorical resurrection," and energy was given to the mysticism whose unholy fruit appeared in medicine under the guise of charms and astrological speculations. The chief service rendered by the book was the reaction it created in favour of reason—a fit preparation for the work of Maimonides.

Solomon Ibn Gebirol, a Spanish Jew born in Malaga, was a Mystic instructed in the doctrines of Plotinus and other Alexandrians. He combined the teaching of Aristotle and Plato in a way which neither would have recognised. His views led directly to pantheism—to the identification of the supreme intelligence with every part of the sensible world; but he parts with his own scheme at this point, and places the Word as the intermediary between the world and the essential Unity—the agent by whom all things are brought about. Thus he saves to his conception of the Supreme Being the liberty of action which his system seemed to sacrifice. Man's freedom of action he maintains, for man is but an epitome of creation. Thus he seeks to reconcile the Oriental doctrine of emanation with the biblical teaching of a personal Creator or supreme, omnipotent will.

Whether due to their creed or to some other influence the Arab students confined themselves to their speciality so exclusively that Ibn Roshd, the more familiar Averrhöes, stands out as a student remarkable for the width of his studies and the catholicity of his tastes. He was more after the fashion of his Jewish contemporaries. Trained in theology and jurisprudence—

really facets of the same knowledge—he was meant to follow the steps of his grandfather, the most eminent of Cordovan jurists. But poetry competed for his attention with philosophy, mathematics, and medicine. He lived in troubled times—the triumph of the Almohades coincided with his youth, and he was favoured by Abd-el-moumen, the first ruler of the dynasty in Morocco, an enlightened prince who sought to establish colleges in his new domain. His successor and son, Yacoub Yousouf, continued the favour, and a few years later (1169) Ibn Roshd was Kadi at Seville; in 1182 physician at the court of Yousouf in Morocco, and, still later, Kadi at Cordova under Almanzour, third ruler of the dynasty. He now got into trouble by the utterance of opinions at variance with the narrow views of his contemporaries, and was banished to Lucena, a village near Cordova inhabited by Jews, who, as a nation, were then under the ban of Almanzour. The Jews of Lucena were converts to Islamism, and as such distrusted by both creeds. It is probable, therefore, that this disgrace indicates belief in the story that he was of Jewish, not of Arab extraction. Be that as it may, he was restored to favour, but only partially; for an eastern Mussulman found him in compulsory seclusion, free, but not at liberty to leave his house. He died in 1198. Under a ruler who denounced philosophy and destroyed works on that subject, Ibn Roshd was a commentator on Aristotle, whom, however, he read by Neo-Platonic light. There is much in common with Ibn Gebirol, but he seeks to conform his views with the Koran, with great subtilty, but not with convincing effect. As a medical writer he says himself that his writings are unintelligible to those who are not conversant with philosophy. Under such

guidance nature would have as much scope for her benevolence as Isaac the Jew specifically enjoins.[1]

Musa ben Maimon or Rabbi Moses ben Maimon was not a pupil of Ibn Roshd, but, as a near contemporary, shared in the general spirit of the time. His medical writings, so far as they are published, are Hippocratic, and most interesting for their discussion of tubercle and lung affections; and the scanty morbid anatomy, chiefly comparative, acquired under Arab inspiration, is applied to the distinction of those diseases which cause and those which do not cause uncleanness. His popular treatise on poisons is full of practical instructions, rich in remedies, and based on knowledge of the various kinds of poisons, the natural history being very full. Abridgments of Galen,—whose formal classifications appealed to the Arabs and especially to the Aristotelians, but checked research by rendering anatomy unnecessary,—extracts from Avicenna and commentaries on the aphorisms of Hippocrates are among the many works which testify to his wide reading; while a treatise on the preservation of health combines physical with moral precepts, a union much lauded by Albertus Magnus. His remarkable familiarity with the Talmud gave him great influence, and originated treatises of large size and of much importance. His system of Psychology, founded on that of Aristotle, differs from it in some respects. He maintains man's freedom, for while other faculties are inseparable from the body, imagination as a function of intellect is the form of the soul itself as the soul is of the body. There are two conditions of intellect, the one material, of

[1] Guy de Chauliac had a different view. Philosophy to him is "Pelagus quod non licet medicum navigare"; to-day he might almost say, "quod non potest medicus navigare."

the body: the other a direct emanation of the universal intellect. Thus he is brought to face the problem of immortality, and does so with embarrassment, admitting a corporeal return, as the Bible teaches, but regarding it as a future miracle of limited duration, whereas the real end of man is the spiritual immortality when the soul, purged of its impurities, will devote itself to the contemplation of the supreme truth. The knowledge of God can only be attained by aid of all the knowledge open to man, who to use it rightly must be of perfect health. It is a splendid repetition of the Mosaic theme, and such as only a physician could frame. His ladder of the sciences is admirable. Logic and mathematics bring us to the gate of the temple: Physics opens to us the vestibule: Metaphysics brings us into the sanctuary. Amid the allegorical interpretations of the Mosaic books, he combats anthropomorphism by denying the possibility of comparison between the created and the Creator. If, he says, God has positive attributes and if these are essential to His nature, we lose sight, like the Christian Unitarian, of His unity. This argument practically leads to the extreme conclusion that we cannot attribute to God existence and unity, for these are accidental attributes. But what this mystic conception denies he restores under the negatives. God is conscious of Himself, is pure intellect; the object and the act of thought are identical. The existence of God, His unity and immateriality, are compatible with the eternity of the world. Nevertheless he accepts the creation as an article of faith, and affirms that this is more acceptable to reason than its denial. His doctrine of spheres has the earth as the centre; and the stars, as the Psalmist says, 'declare the glory of God.' Prescience he admits, but

declares we know nothing of the way in which God sees things; preordination and free will are not therefore incompatible. His reconciliation of Scripture with reason is based on all available knowledge, and though hampered, if one may venture to say so without being misunderstood, by his religious convictions, his writings gave the impulse to thought which culminated in Spinoza and Mendelssohn. It is worth note that Maimonides belongs to the time when, in Christian Europe, the Albigensian revolt against extreme clericalism shook the religious world. It was a time of unrest, when authority struggled with the yearning, ultimately the irresistible demand, for individual freedom of judgment.

Such were the leaders of thought in the Middle Ages. Is it to be wondered at that, in defect of the experimental methods of anatomy and physiology and other more recent sciences, Medicine remained as Isaac saw it —a waiter on nature; well versed in symptoms, but lacking a scientific guide to their meaning, shrewd in the use of certain drugs, but thus striving by multiplying them in their prescriptions to reconcile incompatible symptoms, the key to which had not yet been found?

Animated by the love of knowledge, the Jews at this time were far in advance of their Christian contemporaries in many respects. Their devotion to observation was supreme, and, to this extent pupils of the Arabs, they adopted all that the infant Chemistry could teach.

We find them in attendance on the great, not always openly as they had been on Basilius and Justin—as they were on Giovanni de Medici, as Maimonides was on Saladin, as Jehuda bar Joseph on Ferdinand III.

Charles the Bald was the son of a Jewess, and Zedekiah was his physician. Don Pedro had Abraham ibn Zazal, Henri IV. had Manuel Pomentel as his friend. In the sixteenth century De Pomis got leave to attend Christians, but before that, in the thirteenth century, Moses of the Tibbon family was forbidden to practise, in the interests of the Christian doctors; yet the Jews had masters in the art, and were not content with the cramping system of apprenticeship. Louis IX. had need of an oculist, but curious diplomacy was needed before Abraham of Aragon could be fetched to tend him. At that very time Jews were examiners in the school of Montpellier, for none else were fit for the duty. It is uncertain whether Jews were the founders of the school of Salerno, which, in 1160, Benjamin of Tudela visited and declared "the best of the schools of the sons of Edom." This does not disprove its Jewish origin—only shows that it had fallen into Christian hands, though Jews attended it. There is less doubt that the founder of Salerno, as he is called, took without acknowledgment receipts from a Jewish author.

The picture would be incomplete without the shadows, and these are unhappily conspicuous. Conversion to Islamism took place most usually under compulsion, and some were thereafter bitter enemies of the faith they had forsaken: let us charitably suppose that this was only a means of assuring their own safety.

The policy of Alphonso XI. of Spain was troubled by the competition of two Jews—Benevista Halevi, financier and physician, who sought to favour imports from Grenada, while Abenhuacar desired to establish protection. Jealousy on the part of the latter was the motive of this economic absurdity, foreign to the spirit

of his race. A Christianised Jew of Bagdad, Jahia ben Aschesla, became Mohammedan, and wrote against Jews and Christians with impartial zeal.

Montpellier, the glory of Jewish culture, was not uniformly wise. Simon there strove to stifle science and to end the heresies of Maimonides. Astruc, the better known name of Abba Mair ben Moses, of Montpellier, was a determined enemy of science, and had a powerful associate in Asher ben Yekiel, a great Talmudist, who fled in 1294 from the persecutions in Germany.

Beside the conversions from Judaism, there are few of note to Judaism from Christianity, a surprising fact, since the Unitarians seem to be on the balance between two opinions. I do not say they ought, but it surprises me they have not gone over to the elder faith. An old Jewish writer declares that the ceremonial law is not the sole feature of Judaism; the obstacle is thus slight.

I close my remarks at the thirteenth century, because it is not easy to trace the Jew element in our profession at a later date. Last century Jewish doctors accepted inoculation and pressed its adoption, while mountains of literature accumulated in which Christians found store of argumentative weapons in distorted readings of the Old Testament. This was not a question of race—it was the judgment of competent practitioners, more clear-sighted than the mass of their contemporaries. But it is certain that the race has had—still has—important share in the progress of knowledge, and it is from no remote authority I learn that the success of younger Jews counts for something in the anti-Semitic feeling abroad. In this country that feeling does not manifest itself; it may exist socially, but it is not, on the surface, aggressive.

I might point to men holding high positions in science whose nationality is admitted, even avowed; and it may be that the future historian will have to enlarge from our own time the bead-roll of famous men of which I have given here a mere hint.

ADDRESS ON THE HUNTERIAN LIBRARY

DELIVERED AT THE ANNUAL MEETING OF STIRLING'S AND GLASGOW LIBRARY

[Date 1897.]

The custodier of a Museum, especially when it includes a library, has much responsibility, but many pleasures, many compensations. The honour done to the Hunterian Library in inviting me to take part in your proceedings, I accept; if disappointment follows my performance, you must accept it. But I anticipate for you a certain amount of satisfaction, as the collection of books in my care is not well known, and though I address those who know far more about books than I, even experts will hear with interest what there is to tell as to the growth of an eighteenth century library.

The founder is not well known, he has been overshadowed by the fame of his younger brother, whose collections had the advantage of being housed in the metropolis. Even Blades, a bibliographer, therefore by a sort of divine right accurate, gives "J. Hunter" as the purchaser of Caxtons: and an official of a State department dealing with historical documents was lately under the belief that the Hunterian Library was in London. Nay, a

member of the University General Council only five years ago thought that it was in the University Library.

William Hunter at one time, long before his brother died, entertained the idea of gifting his collections to London, and approached the government of the day with a scheme which was supported by some of his powerful friends. Luckily the offer was not attended to, and so Glasgow became richer by a noble gift, the University the possessor of a great treasure house. At Lincoln's Inn Fields there is no such library.

When all has been published that bears on W. Hunter's work, he will not, I venture to think, be found to fall behind his better known brother, who was in some respects a lesser man. John confined himself to his professional studies with truly admirable results; William drank the cup of intellectual life with both hands, and, if he did less in the way of publication, he certainly established a far wider claim on gratitude. He did many things, and all well. An admirable teacher, a successful practitioner, of unrivalled skill in the making of preparations, these would exhaust the powers of an ordinary man. But Hunter was besides a man of society; no practitioner moving in the upper ranks of courtly circles,—he was attendant on royalty—could live a life of learned seclusion; he was the friend and associate of Sir Joshua Reynolds, he was known in all the capitals of Europe as among the virtuosi whose purse ministered effectively to a cultivated taste. In those days any one who gathered objects of interest was spoken of as a collector of curiosities; Hunter was that and something more. The tusk of an elephant found in the English Channel set him to enquire how it might have come there, and to discover that there was a bed or beds

under water whence it probably came. There are notes about all the animals whose skins or skeletons he added to his museum, largely anatomical, but prompted by the true naturalist spirit. He bought coins and medals at first perhaps promiscuously, but latterly, indeed at a very early stage, he was rather fastidious; dealers sent him catalogues, but the purchases were selected and directed by him. Of that remarkable cabinet part was catalogued by his trustee, Combe, whose *Catalogus Nummorum Urbium et Populorum* is still a book of reference. Time has impaired its value in so far as more recent discoveries and fuller knowledge always tend to supersede the labours of the pioneer; and so there is need for a new edition. That need will soon be more than satisfied; it has been already announced that a wider view of the *Urbes et Populi* has been taken, and that a practically new catalogue will be published at the charges of a citizen who rightly appreciates the value of the cabinet, and who some years ago learned the interest of these coins in the historic lands of which he became possessor.[1] Mr. Stevenson has set a noble example; Glasgow has never been remiss in furthering the interests of the University, but this is the first gift which secures to it the means of spreading the knowledge locked up in its treasures over all the schools where learning is cultivated. Some years ago that wise friend of the University, A. B. M'Grigor, contemplated the raising of funds to secure the publication of a catalogue of the Hunterian Library, as he had helped in the matter of

[1] This catalogue of the Greek coins has been prepared by George Macdonald, M.A. It is beautifully illustrated. The first volume was published in 1899, the second in 1902, and the third is now (1904) in the press.

the University Library. He died *re infecta*; some of the friends associated with him in the design are also dead, but I trust that other friends will accomplish what he was permitted only to contemplate; for the library is as remarkable as the coin cabinet.

The same intelligent personal supervision was manifested in choosing from sale lists, and even greater care taken by Hunter to obtain exactly what he wanted.

Of the personality of our great countryman we have occasional glimpses. Pine and Sir Joshua have given likenesses which well accord with an unpublished medal shortly to be engraved for the Hunterian Oration recently given by Dr. Hingston Fox, whom I mention with the greater pleasure that, among recent writers, he is the only one who has asked for information regarding the Museum from those in a position to give accurate data. We know from Smellie that Hunter was a fluent (glib is Smellie's word) speaker. He was in fact a very ready and elegant speaker, and this was an important element in the enthusiasm which his lectures created in his students. Of irrepresible energy, of insatiable appetite for work, one can well understand his intolerance of carelessness or indifference, and can pardon the ferocity with which he denounced the unknown student who injured one of his precious preparations. Those who have seen the works of art which he created for his anatomical series will sympathise with his fury. Rare are the glimpses we get of the man in personal professional relations; fortunately there are scraps showing the warmth of heart which went with the warm temper. He seems to have been often in controversy, even his brother John had an unhappy difference with him as to

a piece of anatomical research. Monro Senior and he fulminated at each other in pamphlets which are preserved among a large, very large, collection of pamphlets euphemistically labelled by me "Medical Controversies," quarrels is the more correct term; last century had many of them. I do not fancy Hunter was altogether an easy person to get on with, at least that stupid or conceited people would not find him so. Woe to him who tried to get an advantage over "him." He was very keen in business, sharp in saying what he thought. But he was altogether too wide in his sympathies and interests to take advantage of any one. He knew and could do too much and too many things to find it worth while to take unfair credit. Much valuable work in bibliography he never cared to publish, though it was in advance of the ideas of his time.

His five years at Glasgow University equipped him for a great deal of the study he engaged in, though how he found time for it is a marvel. You will expect me to tell you the principle on which the library was gathered, but I cannot. I fancy he changed his mind more than once during the work, and that the addition of bibliography to the ordinary motive of a practitioner in gathering a working library of medical books came after financial success and social popularity brought him in contact with men of letters and leisure.

I have roughly estimated the number of books belonging to different epochs, and find that it contains 381 works (not volumes) dated prior to 1500; 249 between the century and 1525; 1715 published in the next 75 years, while the following century furnished 1486 to the library. The remainder of the books, some 7000 in round numbers, are (I speak now of volumes, not works),

current professional books, serials, and general literature. The old catalogue, prepared in the early days of the century, is a little embarrassing, for it is not easy to disentangle the pamphlets, and yet these are in interest as in bulk a very valuable possession. Everything was preserved; endless controversies and squibs regarding a notable fraud of the day, the rabbit-woman of Godalming, vaccination and inoculation, a charming gathering of all the objurgatory language that medical men were (perhaps are) capable of applying to each other when crossed in debate or anticipated in discovery. The medical controversies already mentioned form a choice collection of considerable psychological interest. Last century was the age and paradise of pamphleteers; but though so many made use of this weapon, though 'anonymous pamphleteer' was, often justly enough, a term of reproach, the injury to literature and to the people was not great. The society journalist of to-day was distributed between the harmless newsletter man, who chronicled Miss Blank as a "catch," and gave the amount of her fortune, and the Snake of Sheridan's comedy who stabbed in the dark, not always for pay that made the trade profitable. Pamphlets were not to be had daily for a halfpenny as newspapers now are, and that restricted the area and amount of their evil influence. But they went fully into the matters which were their cause or excuse, and had at least an appearance of sincerity: they were not ostentatiously and defiantly superficial. Hunter had his share of this form of publication, always in his own name. Douglas and others thus fought the battle over the employment of man-midwives, a controversy easily settled in practice by Royalty, for Hunter and his colleagues were not admitted to the queen's chamber till the child

had been born, practising in the palace as if in the harem, after a fashion not readily realised by us. Pamphlets on the South Sea Bubble have kept me idle when I ought to have been otherwise engaged. The vicissitudes of East India Stock and of its management bulk largely. Surely Hunter or his friends were heavy holders. Ventures in the American colonies might be deemed responsible for the wonderful collection of books and pamphlets regarding them. I prefer to impute these collections to a restless interest in everything and a quick comprehension of the issues raised. After all, these ephemeral writings are of the deepest interest to those who would know the shifting popular opinion in the critical days of the middle eighteenth century. Besides the bundles of tracts awaiting the binder, there are, among the bound volumes, many containing rare tracts as to the early condition of the North American colonies, sheets of date 1649, others telling of events in 1745: Lovat and Balmerino figure, and the young Ascanius in various lights (or shades). Peter Low, 1611, is in the company of James's powder, Smollett on the Bath waters (not so interesting as the account in Roderick Random); but more precious are Sir Joshua's addresses to the Academy, as they were annually delivered, and a set, alas not quite complete, of the Royal Academy catalogues. Shakespeare's poems, 1640, single plays, as *King Richard III.*, 1629, *Henry IV.*, 1599, *Hamlet*, 1676, as well as *Two Noble Kinsmen*, are random selections. John Knox, the champions of Queen Mary and those of her execution are impartially present. Tarbet's defence of King Robert against the imputation of illegitimacy is interesting in its 1713 edition (the second), for among the MSS. is a copy bearing Tarbet's signature, but wholly unlike

either text as printed. *The Charge*, the *Tryall of King Charles*, and the speech at Whitehall, separate prints of Spenser's poems, the *Souldier's Catechism*, 1684, pamphlets of Drake and Raleigh, nine consecutive volumes of American documents giving the lucubrations of the Mathers and Cotton, the new passage to Cathaia, 1576 and 1584, a MS. of Dobbs on the North-West passage, and London almanacks about 1772. Need I say more to make clear that there is much to be done in giving account of the collections? Whoever undertakes the task has a delightful time before him. Labour it will mean, pleasure also, none the less to my mind that it involves desultory reading, of which I am a shameless admirer and inveterate practitioner. I always try to inculcate this taste on my "grave and reverend juniors," as Huxley happily termed the prematurely accurate youth who had lost some of the pleasures of youth by ignorance of the unscientific fairy tales which delighted a simpler age. He who ransacks pamphlets may waste time, but, if nothing else, he will learn, unless he is a fool, how to set about the next investigation so as to keep void of offence a time-saving conscience, if a librarian respects such a thing where books are concerned. It is said, and, I fear, believed, that a librarian who reads is lost. My experience of librarians who do not makes me wish that they were lost also. The foolish aphorism was surely meant to apply only to those who read without power to make after use of what they had read. But I must quit this dangerous ground.

If the earlier efforts of Hunter were directed to the gathering of a professional library, his latest were guided by artistic considerations which were suggested by his

coin and medal acquisitions and increasing intimacy with the leading artists of the day, not to speak of the opportunities placed in his way by booksellers and auctioneers, here and abroad, so soon as his reputation was established as a wealthy patron of the fine arts. Few of the fashionable engravings of the day but were offered to him. His taste in painting is seen in the small gallery he formed, a remarkable one for his time and position. Sir R. Strange engraved "Originals in Dr. Hunter's possession," and fragments of prospectuses show how wide were Hunter's interests in schemes not always carried out. Apart from works on coins and classical antiquities, the French artists Gravelot, Eisen, Moreau, Audran, are represented in choice works, not always fit for prizes in ladies' schools, but, like Hunter's Academy diploma, precious as illustrating an art no longer practised, killed by photography and modern haste. Only art motives can explain the purchase of Kaempfer's book on Japan, and several volumes on branches of Natural History in which it was impossible for even Hunter to take more than a gentleman's interest. I use this foolish phrase of purpose, for it recalls the curious side light on professional conventions cast by Smellie, Hunter's compatriot and rival, in a letter which I found last summer in the library, and which Dr. Glaister, not then contemplating a second edition of his life of Smellie, kindly allowed me to publish. In that letter (*Brit. Med. Journal,* Aug. 29, 1896) Smellie analyses his own character in a strange way, and, speaking of his relaxations, says, they were "designes in drauing and musick: but no more than what was fit for a gentleman to know, and he used to jock those who spent too much time in these recreations by axing if they were no asheamed to

perform so well." Hunter was not the man to hold himself in obedience to such narrow views.

It surely was for art's sake that he bought the MSS., at least a large number of them. We there find a series illustrating many of the steps which illumination had to take before it finally gave way to the woodcutter, who at first followed in the line of his slow, refined and painstaking predecessor. Heath Wilson was well aware of the importance of the lessons to be learned on this subject in the Hunterian Library, and used to point out to visitors, whom he brought to admire his favourite objects, the passage from the earliest symmetrical designs to the later freer work. Hunter amid his gathering of books of recipes did not neglect those dealing with the colours to be used in illumination, he almost seems to have desired to understand the mechanism adopted by the monastic scribe. Students of Pollard's works, *The History of the Title Page*, or the *Early Illustrated Books*, in the Books about Books series, will find means of following the gradual preparation for the swift transition from the one to the other kind of art. I fear it is not in my power to show the origin of the book-plate as a detached print of the patron's arms, which in place of standing as the third or fourth leaf, was fastened on the front board: I have no detached plates. The great *Vita Christi* is a monument of untarnished colour; but the *Venerie* of Guillaume Tardif is, to my thinking, a work of unrivalled beauty, incapable of being excelled. The Rev. Prof. Lindsay has found in the illuminations of a *Boccaccio* important material for the demonstration that ecclesiastical vestments grew out of the ordinary costume of the day, fixed to special duty, as was the dress of the Blue Coat School. I am sorry that the ordinary morals

of the time are also illustrated in that volume, and that, as François Michel showed me with a little malice, the Scottish Guard were in this respect true children of the time, not better, let us hope not much worse, than their neighbours. Among documents interesting in virtue of their contents is an early MS. copy (1546) of the *Canterbury Tales*, not of importance save of the philological sort; for this MS., like many another, came from the eastern counties; indeed, this is a very prominent fact regarding the collection. Thomas Martin has left record of his ownership on many a MS., and the offence of displaying so much penmanship on prominent places is scarcely atoned by the bibliographical notes, often curious, elsewhere added. Occasionally we get a hint that a rare volume may have represented a fee not otherwise to be met—let us hope that the service rendered justified the sacrifice, on the altar of gratitude, of a family treasure. Again, a surgeon in Norfolk offers a MS. with a courtesy which suggests Richelieu's jest at himself that he could be bribed by a book. While preparing his edition of Chaucer, Urry borrowed a copy of the Pynson edition, and a MS. note directs it to be forwarded to the shop of a coach-painter, Haymarket. It too came from Norfolk, did it ever go back? Another MS. is ostentatiously declared to be the property of the children of a deceased gentleman; but its possession by Martin suggests that it had been sold by the family, perhaps to save disputes. Amid much that one learns, albeit of little use, there is much cause for regret. We cannot wish well to the soul of the man who carefully washed out the name of the former owner of the French *Roman de la Rose*, for the sake of recording his own insignificance. Fragments of accounts, draft indentures and the like are inscribed on

the broad margins or vellum leaves, usually however too brief to guide to the identification of the writers, though sometimes a convenient date is thereby given; but it is matter of rage to find blanks or margins freely excised, even though parchment was dear at the time. It is only one degree less culpable than the utterly inexcusable practice of some people to cut out blanks so that an old leaf may be available for binding into some other volume to which the insert is foreign, and misleading to the collator. Compared to this, Grangerising is respectable, though there is less blame if the Grangerite destroys the volume plundered, as robbers used to efface the evidence of their crimes by killing their victims: better a lost than a mutilated book.

Bartholomaeus de Proprietatibus Rerum is among the printed books represented by the editions of 1482 and 1535; its interest is enhanced by the presence of no less than four MSS., one of which is dated 1209, two have no date, the fourth, of date 1372, dedicated to the King of France, Charles V., contains a number of cuts showing costumes, in outline merely, not yet coloured. Lydgate's version of the *Fall of Princes* is a beautiful volume dated 1440, Parker's *Dives et Pauper*, as well as the *Musica Evangelica*, two MSS. of the *Catholicon of Joannes de Janua* one of which, of 1407, bears the autograph of Peter Burmann, the fourteenth century *Roman de la Rose* already mentioned (not collated since it became Hunter's), and Chaucer's version thereof; two copies of the *Myrrour of the Lyfe of Christ*, Guido de Colonna's *Destruction of Troy*, bound up with Mandeville's *Itinerary*, these occur to memory as a fair example of the purely literary interest of the collection. But there is to be added, though the list would be too long for

enumeration now, a number of historical works, the acquisition of which, so extensive is the list, seems due to so extraordinary a chance that I must by preference ascribe it to deliberate intention.

There is a list of the Hunterian MSS. which apparently has escaped the attention or the memory of English scholars, though it is much used by my continental correspondents, Haennel's *Catalogus Librorum Manuscriptorum*, published in 1839. I pray you to help me in recalling attention to it, pending the time when it will be possible to publish a new catalogue. Had it been better known in England, the Chaucer MSS. would have been earlier known. Norris' *History of Launceston*, lost sight of for more than a century, would have been recognised instead of sought for through the columns of *Notes and Queries*, and myself spared the need of answering the repeated query, "Is so and so in the Hunterian Library?" I am not airing a grievance so much as seeking to prevent a serious inconvenience recently brought to my knowledge. Last autumn a scholar inspecting early English works, and induced to come by my answers to his queries, saw Haennel and found therein reference to another MS. in an old library not far from his home.

The migrations of MSS. are not easily traced: the *Cartulary* of the Priory of the Holy Trinity in Aldgate is in the library: is it unique? About ten years ago the accomplished librarian of the Guildhall sought to borrow the volume for the purpose of making a copy. Such a loan it is not competent for the Trustees to grant, but a recent correspondent informs me that the "Guildhall copy" suffices for his purpose. I conclude that a copy made before the original reached Glasgow has since turned up. This might well be: the MS. belonged to

Norris, the author of the *Launceston History* just mentioned, and probably came into Hunter's hands through the same source, whatever that was. Stow refers to it in his Survey, so the probability of a copy having been made is very great. At present I am asked to supply a copy of the Lambertus MS. to the Belgian Historical Commission: how did the letters of the unlucky correspondent of Pope Calixtus get into Hunter's hands? Some years ago Ulysses Robert published a portion of the MS. in the *Bulliare de Calixtus.* Enquiries have been made regarding a MS. titled in Haennel, *Philo de Spiritu.* It is no theological Philo, but a chemist who recorded the results of the distillation of oils. No one has helped me to identify this Philo; perhaps perusal of the MS. might give a clue; I have tried, but my courage failed, for the script is the worst in the whole collection, well deserving the curses lavished by Aeneas Sylvius on an evil writer whose soul he as Pope put in jeopardy for his conceit, selfishness, or ignorance; anyhow, he was a curse to a busy man. On the other hand, there are specimens of caligraphy so exquisite that they were probably expiatory performances, penances, rather than labours of love. Such an one is the 12mo *Office of the Holy Virgin*; nor are the *Horæ*, of which there are several, far behind either in script or ornament. Fowler, Wilson, and Littlehales have examined these, and to their notes the curious may be referred. A Jerome was long among the printed books, but a hole in the skin compelled the scribe to divide a word and so the real character of the beautiful script was evident the first time that it was carefully examined. The oldest document is the *Homilies of St. Basilius*, whose date, 899, was determined by Caspar Réné Gregory; it is interesting, apart from its

age, as an example of transitional Greek script. Of Oriental MSS. the number is large, the beauty great. Of these I cannot say much of other people's knowledge, nothing of my own. Two volumes deserve special note, one is a series of draft proclamations, Queen Elizabeth's signature being autographic, some of these, referring to the trade with Spanish Netherlands, being curious; the other contains a large number of letters addressed to the Earl of Clarendon, dealing with all kinds of matters.

Hunter's personal MSS. are scattered, a few here, the bulk in London, in the possession of his representatives. Dr. Teacher is at present preparing a catalogue of the anatomical series, the cost being defrayed by the Bellahouston Trustees.[1] The catalogue will be prefaced by a general account of the preparations, and we hope the opportunity will then be afforded us of making more of Hunter's work available. Some of his papers are worthy of being reprinted, and it is likely that others were left in such a state that they may be published without impairment of his reputation as a careful investigator to whom inaccurate work was abhorrent. A remarkable instance of this fastidiousness is known. He had arrived at a conclusion as to a particular disease, the *morbus gallicus*, then keenly discussed. He based his views to some extent on the statements of Martyr, but before publishing he found reason to suspect that Martyr was not absolutely reliable, as he spoke from memory after a long interval. Hunter never delivered the paper. Such an edition of his writings would be a worthy memorial of him, and would commemorate none but him whom it was intended to honour. Such papers as I have seen are records of the restless vivacity of the man and the

[1] This catalogue was published in 1900.

often unconventional ways in which he uttered his acute observations. I cannot understand how William Hunter is spoken of as an unlearned man. He had an excellent education, knew how to take advantage of every opportunity of adding to his knowledge, and had a facility of just expression which, to Smellie's lower intellect, was objectionable.

It cannot be doubted that Hunter intended to have full representation of the progress of early printing. The numbers already given prove the bibliographic value of the library. Some details may be interesting. "Thirteen Caxtons" is a goodly possession, and I do not allow for one credited to this library, but not there found. It was probably exchanged; perhaps it was too close a duplicate. Duplication, however, was not dreaded, for there are repetitions, and one may fancy these laid aside as the fund for excamb when good opportunity turned up. It is needless for me to recapitulate to such a company the names of the presses and printers, which form a fairly complete series from the later illustrated MSS. of the fifteenth century to the middle of the sixteenth, when we may take the interest of the contents rather than the production to determine the value of printed works. It is extremely interesting to follow the comparatively slow replacement of the scribe by the printer. I have only two block books, as usual composite. Would that we had here a copy of the *Mirabilia Romae*, or of the *Speculum*, two books which bridge the gap from MS. to printed volume, though the time when one ceased to be and the other came to be general were separated by a longer interval than the successful enterprise of these two books would warrant us in anticipating. Even in the seventeenth century I find from one

MS. of a historical work that an obstinate adherent of the old ways might still prefer the labour of the scribe to the mechanism of the printing office. It was a respectable stupidity, which we cannot afford to despise, since even now there are those who will none of the process reproductions, just as there are men of science, and rightly so called, who think it waste time to read a book of greater than ten years age. The copy of *Thewerdanck* in the library is lovely, the book which so long puzzled even printers, divided between various theories of the production. The type is not worn, the vellum is fine, the ink fresh, and the drawings of Hans Schaufelein charming, though Pollard may be right in thinking that careful printing on vellum has given them a fictitious value. The volume is truly imperial, and it is a monument to Maximilian that he did more to advance the art of book illustration than he contributed to literature. This is not the only vellum book. Early paper was honest, but not pretty. Nowadays we do not find "beauty coupled with honesty," however we may desire that honey be a sauce to sugar. "Cotton" bulks too largely. The Aldine *Plato* is also on vellum, beautiful white skin, white probably because some earlier writing has perished to yield good material. It is too late to lament over this. We can rejoice that, if murder was done, it was done to good purpose. For the Greek type is the fairest of the Aldine press, the ink as glossy as the day it was wet in 1513. Dibdin's enthusiasm was justified when he spoke of this book as the chief treasure of the collection. To crown all, it is bound by Derome in blue morocco. Askew secured it from the Harleian collection. At Askew's sale Hunter paid £55 13s. for it. This book excited the

evil concupiscence of a rarely gifted scholar only one degree less than the *Anthology* of 1494, for which Hunter paid £28 17s. at Askew's sale. Along with these goes the *Cicero de Officiis*, 1466, on vellum. To this group of bibliophile luxuries belong the *Decretals of Boniface*, 1473; Fust's *Epistles of Cicero*, 1466; Claude de Seyssel's *Translation of Thucydides*, Paris, 1527; *Valerius Flaccus*, Paris, 1519; *Lactantius*, 1471; Aretino's *Translation of the Epistles of Phalaris*, Flor. S.A.; *Epigrammata Graeca*, Flor., 1494; the Mainz *Livy*, 1505; *Bartholinus de Bello Norico Austriaco*, 1516; *Il Moro de Heivodo*, 1556; *Dionysii Areopagitae*, 1562; *Articuli Ecclesiae Anglicanae*, 1563; *Petrarch*, 1501; Augustine's *Vita Christi*; *Mainz*, 1470; the *Breviarium*, 1478; Pynson's *Sarum Missal*; last, but not least important, the *Vesalius* which Sir W. Stirling Maxwell reproduced in facsimile, a work which has the double interest that it is a noble production of the press and that the plates are the handiwork of Titian; the anatomy of the human body was ennobled by the combination.

Need I say more to impress on you the judicious lavishness of the founder than that the *Editiones Principes* number something like 200? I have made a rough census, the figures are not absolutely exact, but the catalogue is only in progress. Parenthetically, let me say that had David numbered the people from a MS. catalogue, the task would surely have been counted its own adequate punishment. I find Æschines with 10 entries; Æsop, 9; Aristophanes, 19; Anthologies, 5, all of the sixteenth century; Aristotle, 58, beginning at 1495; Bartholinus, over 40; Boccaccio, 17, the first 1472; Catullus, 13; Cicero, 58, of which 21 are fifteeners;

Ovid, 12; Plato, 23; Plutarch, 23; Homer and Scholiasts, 26; Dante, 4, but 3 are fifteeners; Tasso, 6; Milton, 9. In short, there are nearly 800 entries for classical authors, and for many of these entries there are not texts merely, but every sort of commentary and translation: it was as much a literary man's collection as a bibliographer's. What this means you will understand when I recall that Hunter went over sale catalogues, marking with his own hand what he meant to buy, that the catalogues were almost exclusively lists without the bibliographic helps which make selection easier nowadays—the purchaser then having to depend on his own skill and knowledge. Professional purchases were, as far as might be, a book lover's as well: Galen has 57 entries; Hippocrates, 47; Avicenna, 14; but 7 editions of Mundinus fitly go with the Vesalius. The *Hypnerotomachia* of Poliphilus is in two editions—1499 and 1525—both perfect, a rare fortune, as there are people who are fond to find in innocent things the evil they bring with them, and so deface plates. These two books are precious to the bibliophile, I wish I could say to the reader, for truth compels me to say, perhaps to my shame, that I can only use for the work the language of Dionysius' criticism on the style of Polybius, as quoted by Professor Murray, "he is a writer whom no human being can expect to finish." May I shelter myself behind my colleague's amiable tolerance for those who tire of Marcus Aurelius? "they are not necessarily narrow-minded or vicious in taste." But as a book it is admirable, the print artistic, the woodcuts exquisite in their charming simplicity of line, and the proportions such as we dwell lovingly on. Unique possessions have not much attraction for me, I confess, and shall not

regret if the *Terentius Maurus*, Milan, 1497, is no longer unique. Intrinsically it is of small value, though bought from the Harleian collection. Credited with being unique, it only cost Dr. Taylor—the editor of Demosthenes—four guineas. I am more interested in the collection of Rabelais; it is a strange group, perhaps throws light on the range of that author even in our own country. Not so long ago, the children of the coast towns of Forfar were familiar with the name of Gargantua and the less choice jests of a writer, of whom I have somewhere read, that after he had made a shrewd hit he seemed anxious to conceal it with dirt. Now Hunter had the works in the three Lyons editions, 1558, 1573, 1596: *Pantagruel*, 1534; *Gargantua* (the abridgment by Alcofribas), 1542; and the Valence print of 1547; *Panurge*, 1615; and an edition of 1741. The Alcofribas abridgment is a small tract, a sort of chap-book, and was perhaps the form under which the knowledge was disseminated from the Abbey of Aberbrothock, as a centre of light and leading to the natives of Forfar. There are two MSS. of the *Myrrour of the Lyfe of Christ*, besides the Caxton print, and the differences are interesting. Of the *Catholicon* of Joannes de Janua there are two MSS., one of them once the property of Peter Burmann. And there are three MSS. of Higden's *Polychronicon*, besides the print.

Whence came all these treasures? Askew, Taylor, Ratcliffe, Mead, West, Croft, Cesar de Missy of Berlin, Colbert, Count d'Hoym, Jesuit colleges at various places, other monastic libraries, Royal libraries of France conspicuous by their fleur de lys, the Harleian, these are among the more prominent, but a vast number came from private collections which we cannot now trace. It

is unfortunate that so many of the original book-plates were covered up by the new plate adopted by the trustees when the Museum came into the possession of the University; some of these I have uncovered, but they are those of the private collectors chiefly. How libraries so to speak broke from their moorings and drifted, may be learned in part from Sanders' book on Book-collectors. If it is not always easy to trace well-known collections in their wanderings, less likely is it that we shall learn more regarding the sources whence Hunter, omnivorous in this respect, drew his stores. Even care will not always prevent removal of books which it is desirable to prevent from wandering; some years ago the Russian Government sought to recover the MSS. of Gottfried Bayer, which had disappeared from Russia; it so happened that none were of any political importance. Of the valuable philological papers I have published a list in the Sinological Journal of Paris. One of the MSS. is of very pathetic interest, the narrative of incessant labour in China, of failing health, of hopelessness, but of unabated courage and heroic devotion to duty. I wish there were some of the book lists of the early printers; the nearest approach to anything of the kind is the specimen sheet of the Baskerville press, which dropped one day out of a book not printed at Birmingham. It is now near the stereotype plate of Ged's *Sallust*, the Scottish printer having priority by several years over Didot, whose name is now commonly identified with an improvement which, while it makes books easily multiplied, also renders cheaper the production of newspapers.

It would be ungracious to those who seek to make books pleasing were I to omit mention of the bindings.

The Grolier Club in the United States has set an admirable example, not yet followed so far as I know, but well worthy of imitation. For several years I have set out specimens of bindings in the show-cases, and have lately extended the selection. Grolier is there, with the other noble friend of learning, Maioli; Derome, Pasdeloup, and their successors and more or less successful imitators are well represented. There are curious copies of Grolier, that seem to have been taken as the easiest to deal with, the mistake being not uncommon that simplicity is simple, whereas it is usually consummate art. Maioli has escaped, the mechanical difficulties having been better recognised. Doublée bindings are not scarce, one panelled with citron morocco being very fine. A French binding stands at the head of the fantastic, being inlaid, five pieces of different colour on the front board. There are silk linings, but the quaintest use of this material is the sewed cover of Elizabethan age, a silver threaded centre having at the corners portraits in which one may, if he chooses, recognise Ben Johnson. But the lover of simplicity will rest with content on the plain *veau fauve* of D'Hoym, or the citron morocco of a choice number of goodly quartos and folios. These never attract the attention of the ordinary visitor. who would likely go into ecstasy over an impossible landscape on a vertical plane drawn by an up-to-date person who has taken the Egyptian book of the dead as his model, as if that was the culmen of art. It has been pointed out to me by a practical binder (amateurs lose much by not taking lessons from practical people), that there is a good field for studying the progress of manipulation, the methods of using tools. Certainly there is a useful set of embossed bindings. Those who

fancy wooden boards would find that there are tricks to be learned even there, that the old men are not the innocents we are often asked to believe them. The University Court allowed a sum for the repair of the Hunterian books, and a most judicious liberality it was. The first thing was to stop mischief, the second to improve. The two are practically the same thing, and the result has been most satisfactory.

Long as this address has been—too long, I fear—it is after all a mere fragmentary sketch. Enough, however, has been said to show you that, if you are the directors of a library whose object is fulfilled by its usefulness to the public, Glasgow has reason to be proud that among other claims on the city the University is the possessor of a collection becoming to a seat of learning, and an object of interest to all scholars. The many applications for reference to its volumes are a joy, for they furnish me with a legitimate excuse for giving time to the desultory reading I love, but do not always venture to indulge. It is a pleasure, a rare pleasure, to have an interested visitor; it is a higher one when a scholar, an authority in some department of learning, comes, for then I learn what will be useful for others, and the more eminent the bibliographer, the more ready to impart knowledge; those who have gathered by years of toil are generous in imparting the fruits of their studies; many an entry in the catalogue is due to such kindly informants, and it is not always either easy to record the service or to avoid the appearance of ingratitude. When the arrangement of the Museum was burdensome, some twenty years ago, Dr. Dickson kindly left me free to attend to the rest by undertaking the placing of the books on their shelves; for that service I have to thank

him. I am specially bound to record my thanks to Professor Ferguson for the constant interest he has taken in this part of my duties, and the help he has always been ready to give from his abundant and fastidiously accurate knowledge.

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